

DRAGON USER

International edition

75p US\$3.25

May 1984

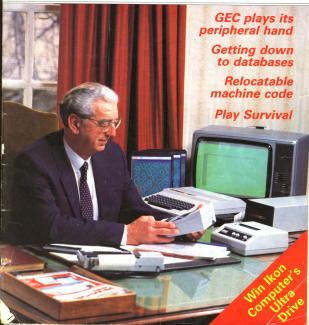
The independent Dragon magazine

**GEC plays its
peripheral hand**

**Getting down
to databases**

**Relocatable
machine code**

Play Survival



INTERGALACTIC POLICE NOTICE BOARD

See
Salamander
Software
Catalogue
from 1985

LASERZONERS BEWARE



Workends of Zzyax are approaching Earth. General Psychopathic tendencies and his army lead us to believe their visit will not be friendly. All Laser Zone Gunners to report immediately. Game design by Jeff Lomasoff. Minter. Price £7.95



GRIDRUNNER DROID

For droids as unspeakable we can't print them on the warrant. See for yourself for a mere £7.95. Game design by Jeff Lomasoff. Minter.

MISSING PERSONS

DAN DIAMOND P.I.

Last seen following a large white rabbit into the woods. Look out for his new adventure coming shortly. Franklin in Wonderland.



WANTED



- RED MEANIES

REWARD - Three tons of Wensleydale

WARNING - These generally despicable creatures are currently causing havoc by kidnapping Intergalactic Cheese-sufflers and herding them in endless masses beyond the realms of time and space. Tread with respect and a large stick. Price £1.95

"A SISTER WOODS ARCADE GAME" - ... a small furry creature from Alpha Centauri.

Please add My P&P, to all orders. Send AS SAE for full catalogue. Cheques or postal orders payable to:

Salamander SOFTWARE

17 Norfolk Road, Brighton, BN1 3AA.

Telephone: Brighton (0273) 771942.

TURTLE GRAPHICS - An implementation of logo - £9.95

DBS - Database Retrieval System - £14.95.

Available from selected
Computer Shops &



DRAGON USER



Telephone number
(All departments)
01-827 4343

Editor
GRAHAM CURRIBGHAM

Assistant Editor
GORDON ROSS

Software Editor
GRAHAM TAYLOR

Editorial Secretary
CLIO CHERRY

Advertisement Manager
DAVID LAKE

Advertisement Executive
SIMON LANGSTON

Administration
THERESA LADY

Managing Editor
DUNCAN SCOTT

Publishing Director
JERRY IRLAND

Subscriptions
020 271 0170 for 12 issues
Overseas (surface) £18 for 12 issues
ISSN 0264-2077. Telex: 295275
Dragon Data, 12/13 Little Newport Street,
London WC2N 6LD.

UK address: c/o Business Press
International, 205 East 40th St, New York,
NY 10017.

Published by Sunstone Books, Scott Press
Ltd. (Sunstone Books 1984)

Typesetting by Graphem Press, Chesham,
Bucks. Printed by Eden Press (Southern)
Ltd, Southampton, Essex.

Distributed by B.M. Distribution, London
SW9 6JF. Tel: 01-275 1811. Telex: 261543

Registered at the Post Office as a news-
paper

Dragon and its logo are trademarks of
Dragon Data Ltd.

How to submit articles

The quality of the material we can publish in
Dragon (each month) is a very great
extent, depend on the quality of the
documents that you can make with your
Dragon. The Dragon 50 computer was launched
on to the market with a powerful version of
Basic, but with very poor documentation.

Every one of us who uses a Dragon will be
able to discover new tricks and quips almost
every day. No help other Dragon users keep
up with the speed of the development each
of us must assume that we made the
discovery first — that means writing it down
and passing it on to others.

Articles, which are submitted to Dragon
Data for publication should not be more than
8000 words long. All submissions should be
typed. Please leave wide margins and a
double space between each line. Programs
should, whenever possible, be computer
printed on plain white paper and be accom-
panied by a tape of the program.

We cannot guarantee to return every
submitted article or program, so please keep a
copy. If you want to have your program
returned you must include a stamped,
addressed envelope.

Contents



Letters	4	Cover feature	30
Information on interfacing and confidential listing, advice on obtaining back copies of Dragon User, plus our blunders con- sidered		GEC McMichael's chairman Ron Macaulay interviewed (Cover photo: Graeme Tucker)	
News	9	Random Art	33
The latest hardware and software develop- ments, including both educational and adventure-oriented games		Paul Gaby programmed his Dragon to paint modern art	
Clubs	12	A question of luck	37
Dragon clubs and the role of the national Association of Computer Clubs — the representative and liaison body for com- puter clubs across the country		John Royle looks at the Monte Carlo technique — a method of solving com- plicated problems using your money	
Software selection	16	Nomadic code	41
John Schmitt comments on the rising standards as he takes on another batch of challenging games		The position independent program is a real bonus for the 6800 programmer	
Magic Machine	21	Maina notes	45
Patrick laser fire pursues Bob Liddell in his strange odyssey		R Garrett offers relief from the effects of main interference	
Serious system	23	Open File	48
Keith and Steven Brain scrutinise the expanding range of business and "pro- fessional" software		A varied selection of programs include String input, Femicon, Numbers, Memory and Transrac	
Caterpillar capers	27	Dragon Answers	65
The games of the month, sent in by one of our readers		Brian Cadge gets his wits against your problems and comes up with the answers	
		Competition Corner	68
		Pick the prizes and win an Ultra Drive from Icon Computer Products	

Editorial

PROBLEMS WITH SAVING and loading software have long beset users. The reason we're not able to recommend any particular cassette decks is that manufacturers sometimes change component suppliers. So one deck might work for us, but not for you if its manufacturer has decided to buy components elsewhere in the meantime.

But now help is at hand, and electronic giant GEC is the unlikely St George. Its subsidiary GEC McMichael, which took over UK sales of Dragon Data products earlier this year, is to introduce a cassette deck specifically designed to be compatible with the 32/64. Other peripherals are also on their way, and the tie-up leaves Dragon Data free to develop more micros and strengthen its software catalogue. It also raises the tantalising possibility of the Dragon being linked to other GEC McMichael products — intelligent telephones (or even satellite dishes) for receiving data, and monitors for displaying it. This may remain a dream, but it's good to dream pleasantly.

The tie-up should also help to calm doubts about Dragon Data's future. Last year the company hit serious patches of bad financial publicity, but it could have done more in terms of promoting its products to offset this. For example, by its very title the Dragon 64 was pitched against the Commodore 64. Dragon Data might have been better prompting buyers to consider which micro offered the most user RAM rather than emphasising the "bit" similarities. Or it could have explained that for all its graphics facilities, the Commodore 64 loses out to the Dragon in terms of graphics commands.

As another example, pointing microcomputer architecture looks suspiciously like building houses of cards. Sinclair's QL, with a Motorola 68000 at its centre, is being marketed as a 32-bit machine. But if our recollections of the Motorola catalogue are accurate, that chip certainly has an internal 32-bit architecture, but externally it's all 8-bits. Similarly we think the much publicised "16-bit" IBM PC, with an Intel 8088, has only 8-bits externally. Going back to the Motorola catalogue, and to the Dragon, the 6800 is also 8-bits externally — and has a good many internal 16-bit features as well.

The real breakthrough will come when input/output (external) matches processing power (internal). Acorn is said to be working on incorporating such a 32-bit chip, National Semiconductor's 32032. But then on the other hand National Semiconductor is also rumoured to be having problems delivering that chip. In the end Acorn's ambitions may have to rest with the 18032. Interestingly Acorn is also expected to be offering the Xerox operating system. Now Xerox is a Unicom/Unisys, so is QDOS, the operating system Dragon Data has opted for. It's a shame that all these localities couldn't be co-terminous — that would certainly put paid to many of the software problems at the higher end of the user scale.

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters.

Page, Dragon User, 10-13 Little Newport Street, London WC2R 2LD.

In search of Users

I visited three or four places for an October issue of Dragon User and having met with no success, I am now going to the source itself, in desperation.

If you are able to provide this issue, I would be most appreciative, and if you would let me know the cost, with postage, I shall be glad to send my remittance by return.

J. J. J. J. J.

UNFORTUNATELY we've sold out of back issues of the May, June, August and October 1984 editions of the magazine. However, other back copies are available, price £1 each, which covers administrative costs and postage and postage.

Please send a cheque or postal order, made payable to Dragon User, making your envelopes: Dragon User (Back Issues), 10-13 Little Newport Street, London WC2R 2LD. And in case you didn't realise, the first edition of the magazine came out a year ago this month, which makes this month our birthday.

Easier interfacing

I AM NOT normally moved to comment on other people's published articles, but after reading "The Easy Way to Interfacing" in your February issue, I could not resist replying to longer.

Mr. Mansoor's use of a 74LS125, to step the clock to the 29427 A to D which a start conversion strobe is sent, is not required. As both the 6502 VLSI and the 29427 are clocked by C (pin 6 of the Dragon cartridge port), both devices will be in synchronisation and therefore the start conversion strobe will always be in phase.

His suggestion that a separate 5-volt supply be used, rather than running the risk of overloading the Dragon's PSU, is unnecessary. I can assure your readers that the Dragon has enough power in reserve to cope with the few devices used in this design. There are Dragon add-on units, such as disk controllers, that have many more devices in them, and these units derive their power from the

cartridge port without any problems.

During the setting up procedure of the 29427, one is expected to apply voltages of plus 4.5V and minus 4.5V. Now are the majority of people expected to supply such expensive voltages without a lot of bother, or the use of fairly expensive equipment? A more satisfactory solution to the setting up procedure would be to have a bi-polar output derived from the 29428 B to A converter (for more details send a large size to Dragon User, marked inter-face). This could be accurately calibrated with a digital multimeter, a common instrument these days, and the voltage source fed back into the 29427 for its calibration.

A great deal of effort seems to be used in "manufacturing" an extension piece. Tandy stores throughout the country sell a prototype board (Cat. no. 276-100) which has a 40-way edge connector at each end. These connectors can easily be wired together to form the extension piece, but, as the board has ample room for all the devices, the circuit could be constructed upon it.

J. J. J. J. J.

THE ARTICLE'S author, J. J. Mansoor, replies: Originally I was my intention to have the interface as an 80C 0804 which has an internal clock. When switching to the faster Pentad device, which requires an external clock, it would appear that I misinterpreted the data sheet. Hence the presence of the 74LS125 chip which, as Mr. Stancill points out, is not really necessary. My apologies to anyone who has been put to any inconvenience. If the 74LS125 is omitted, the interface should still work with the program unmodified.

It is quite obvious from the comments, that I did not make myself particularly clear on the point of a separate power supply. Perhaps, what I should have said was that when building your own interfaces it is, in my opinion, better to provide your own power supply.

I appreciate that the circuit described is unlikely to overload the Dragon's PSU and also that there are numerous commercial bi-polar and tested interfaces such as disk controllers, I/O ports and the like that rely on the Dragon's PSU without overloading it.

However, in the unlikely event of one's machine being damaged by a commercial interface that develops a fault, the computer owner has some grounds for redress. The owner who builds his own interface is in a less fortunate position, for short circuits and the like do occur even in the most carefully constructed designs, as those acquainted with Mr. Murphy's famous law will testify. Consequently, it is not better to run the risk of damaging your own PSU rather than the computer's? Also, the use of a separate PSU provides for greater flexibility of operation, and for future expansion.

Mr. Stancill asks: "How are the majority of people expected to supply such expensive voltages without a lot of bother or the use of fairly expensive equipment?" — then proceeds to give an answer in his question.

Perhaps another answer would be to use a variable regulated voltage supply and a digital multimeter, the latter being, as your correspondent points out, "a common enough instrument these days".

Most home constructors have amongst their equipment some form of variable regulated voltage source for reasons which are surely obvious. These de-

vices are not all that expensive or difficult to build, as reference to the Mullin catalogue or to R. A. Ponder's instruction book, Power Supply Projects (Bernard Batsford Publishing Ltd.) will indicate.

One must surely presume a certain degree of knowledge on the part of the would-be constructor and it did not appear to be a problem beyond the ability of any keen enthusiast to solve.

According to Mr. Stancill: "A great deal of effort seems to be used in 'manufacturing' an extension piece". But not particularly difficult with the aid of the resources mentioned in the article. I did point out that it was my solution to the problem of accessing the Dragon's cartridge port, and obviously, as such, does not preclude anyone adopting an alternative solution whether it be supplied by Tandy's or from any other organisation.

J. J. Mansoor
Hemel Hempstead
Hertfordshire

LISTing in confidence

I FOUND the technique for disabling the LIST command (Dragon Answers March '84) most interesting. However, it does not provide a satisfactory answer to the need for confidentiality.

The LIST command is only disabled when the program is RUN. It would still be possible to LIST the program immediately after loading, and before it is RUN. It would only provide a satisfactory answer if an AUTO-RUN facility were available.

These comments would equally apply to attempts to prevent printing of a program by disabling the CSAME command.

M. R. Rogers
Norwich

Bad files

THE BM article in the March edition of Dragon User appeared with incorrect captions and references to the diagrams, resulting in confusion in column three of page 33. The reference in diagram 3 in column 3 should be to diagram 2. And the caption on page 37 should read: diagram 2: layout of simple variables storage, diagram 3: the seven overhead lights of an array table.

Software Top 10

1 (1)	The Ring	Microdeal
2 (4)	Ugh	Solfix
3 (2)	Eightball	Microdeal
4 (3)	Outburst In the Jungle	Microdeal
5 (3)	Devil Assault	Microdeal
6 (4)	Hungry Horse	Melbourne House
7 (4)	Propper	Microdeal
8 (4)	Space Shuttle Simulator	Microdeal
9 (4)	SAS	Pocketsoft
10 (7)	Grand Prix	Salamander

Chart compiled by Websters Software



Games that come from...

BEYOND

CHALLENGING SOFTWARE

UP PERISCOPE



PROTECT the convoy using DONAR's Depth charges to seek out and destroy the enemy below!



Try and pick off your Enemy from below the waves!

Kriegspiel



Here comes the first flakes of snow and out of it - their Tanks!



...How much longer can we hold this town...?

KRIEGSPIEL:
A thrilling game of strategy to be played against the Dragon or any other devious opponent.



PLEASE SEND ME...

Dragon

£6.95

UP PERISCOPE

£6.95

Send this page in a sealed envelope...

Write to me
NOW!



QUANTITY

(Please write in)

TOTAL
£

I enclose a Postal Order / Cheque payable to
BEYOND, OR charge my credit card.

Card Number

Valid Access (Delete as necessary)

Name

Address

Postcode

Signature

£05

OASIS SOFTWARE

present . . . TWO NEW RELEASES



SPRINT BASIC COMPILER

A rapid step forward in Home Programming.

The newly released 1.1 updated version of SPRINT Basic Compiler for Dragon 32 and 44 owners. By converting your own BASIC programs to intermediate code, SPRINT optimizes them by up to 5 or even 10 times their normal running speed. Supporting in-built syntax checking, SPRINT also checks and prints commands. SPRINT programs are not fully compiled from start to finish, but can be independently of the compiler.

PETITE PASCAL

Not just a language - an education in structured programming.

Two extended range subset of the structured programming language is the ideal introduction, not only to a language widely used in schools and universities but also to programming itself.

As an appreciation of PASCAL is generally accepted as the best way to increase your understanding of structured languages, this is a must for anyone who takes computing seriously.

OASIS SOFTWARE

Oasis Software, St. Alexander's Parade,
Walsbyr-upon-Maine, Tel. 0934 419961

Please send me:
SPRINT BASIC COMPILER
PETITE PASCAL

£14.95 Q.
£14.95 Q.

Enclose cheque/PO for £ _____
Name: _____
Address: _____

OASIS SOFTWARE

DRAGON 32 & 64

DRAGON CHESS

- Two levels of play
- All legal chess moves including en-passant, castling and pawn to queen promotion
- List of previous moves stored which can be displayed or printed

- Loading and saving of games possible from tape
- High resolution graphics which can be displayed in either black or white (display on other and computer needs text and graphics)

- Subroutine with computer strategy
 - Piece movement
 - Set up from any position
 - Opening move library
 - Moves may be taken back and play resumed from any point
- "I thought this was an excellent version of the game. Well worth buying from Computer Workshop."

- Change level of play during play in the game
 - All legal chess games between humans
 - Very high standard of play
 - Professional looking and dynamic presentation
- "Dragon has it without doubt the best value drug on the market today" (Playboy)



MIND GAMES COMPENDIUM.

All five games for just **£19.95**

Class Products are available from specialist software suppliers, including: **Telebooks, Games & Computers, Microcode, The Dragon's Den, PCS (Australia), Planet, GSP/Computers (France), Hatch Computers (Scotland) and Jayco (Germany).**

If your local dealer does not stock these products then to whom to address and we will contact him.



Access orders taken by phone 24 hours a day.



0634 419821

Every product comes with a guarantee. All prices include VAT and p.p.s.

BACKGAMMON

The well-known game of backgammon, complete with full instructions and computer demonstration for beginners.

REVERSI

All fast Reversi running on your Dragon 32 or 64. 2 levels of play, full instructions and computer demonstration for beginners.

INVADER CUBE

An exciting challenge of the best games of skill written for the Dragon 32 and 64. It also has some of the best pure machine code graphics on hardware seen.

DOMINOES

Two games in one with full instructions. Hours of frustrating fun. This program has 6 levels of play and on the higher levels, adds to its play to its assessment of your ability.



Dragon Software, 10 Alexandra Parade, Wrexham, North Wales. Tel 0934 441921

Please send me

DRAGON CHESS

BACKGAMMON

REVERSI

DOMINOES

INVADER CUBE

MIND GAMES COMPENDIUM

NAME _____

ADDRESS _____

Dragon 32 Dragon 64

£9.95 ☐ £9.95 ☐

£9.95 ☐ £9.95 ☐

£9.95 ☐ £9.95 ☐

£9.95 ☐ £9.95 ☐

£19.95 ☐ £19.95 ☐

I enclose cheque/PO for £ _____

TIRED OF WAITING FOR PROGRAMS TO LOAD? AT LAST THE WAITING'S OVER! IKON COMPUTER PRODUCTS ANNOUNCE THEIR NEW



**
** **ULTRA DRIVE** **
** **£79.95 inc VAT** **
**



The ULTRA DRIVE is a professional automatic digital cassette recorder specifically designed for the home computer user.

- READ/WRITE SPEED 1200 BYTES PER SECOND — A 32K PROGRAM TAKES LESS THAN 28 SECONDS TO LOAD!
- FULLY AUTOMATIC — NO MORE PRESSING RECORD/REWIND/PLAY!
- CAPACITY 200K PER MICRO CASSETTE
- USES NO MEMORY
- AVAILABLE NOW FOR THE DRAGON 32 AND 64
- COMING SOON FOR THE BBC, NASCOM, ORIC, ELECTRON, COMMODORE 64 AND TANDY MICROs
(send SAE for details)
- PRICE INCLUDES ALL NECESSARY CABLES, INTERFACE, OPERATING SYSTEM AND ONE MICRO CASSETTE — NO HIDDEN EXTRAS!

•• 10-DAY MONEY-BACK GUARANTEE ••

BRIEF SUMMARY OF COMMANDS FOR THE DRAGON COMPUTER:

INIT	Initialises new tape
ADVANCE	Winds tape to end
REWIND	Re-winds tape to beginning
HALT	Halts tape between programs
SAVE (Filename)	Saves a program to tape
LOAD (Filename)	Loads program
SKIP (Filename)	Skips to end of specific file
DIR	Displays directory of all files on tape
RUN (Filename)	Loads and runs program
BREAK OFF	Disables the BREAK key
BREAK ON	Re-enables the BREAK key
FAST	Speeds up most DRAGONS
OLD	Recovers last program
APPEND (Filename)	Adds file to program in memory

To: IKON COMPUTER PRODUCTS, DEPT. B, KILN LAKE, LAUGHARNE, DYPFED SA33 4DE. (Tel. 099 431 515)

Please send me

— ULTRA DRIVE(s) for the DRAGON @ £79.95 + £3.45 p&p.

— Boxes of cassettes @ £29.12 per box of 5

I enclose cheque/P.O. value £
(Delete whichever is not applicable)

Please debit my Access/Misc card no.

Name:

Address:

Signature

(Please allow 28 days for delivery. Remittances will not be cashed until goods are ready to be despatched.)

Educated treats from Garland and Dragon Data

MOHE educational titles are on their way — from Dragon Data itself and Garland Computing.

Five educational titles for children up to the age of 11 are coming from Dragon Data. Children from Space is a four-part spelling game for four to seven year olds. The first episode introduces some simple spelling tests, and the other parts go on to deal with past and present tenses, making sense of jumbled sentences and finally choosing words to insert in sentences.

Number Chase for 11 year olds, is an arithmetic number game written by ASL (Applied Systems Knowledge), responsible for some of Dragon Data's previous educational games.

Shape-up, like the name suggests, enables children to create shapes and images and is aimed at the four- to seven-year-old age group.

Tale Adventures (four to 11 year olds) and Face-maker, a creative game for four to eight year olds, rounds up the series.

From Garland Computing comes tales of more computer titles of its educational software used in schools.

Already on release are six maths cassettes originally launched for the BBC, now



Dragon software — making records into the educational arena

repackaged and slightly modified for the Dragon.

Each cassette (price £7 inc VAT) has between three and five programs geared for nine to 12 year olds. Some of the programs, especially the ones involving fractions, have also been used to help remedial children in schools.

The programs use animations and simple games to illustrate mathematical principles. Colin Munn of Garland Computing emphasises that they are not soft-tuition exercises, but rather need the overall guidance of a teacher or parent.

For 10 year olds and above

Garland Computing is considering marketing Understanding the Human Body and Understanding Physics (£12.95 each).

These programs, already available for the BBC, have been converted to the Dragon. However, they are not yet in general release and Garland is talking to dealers before putting money into packaging the programs.

Coin mentioned that individual orders could be dealt with, but like many other firms, Garland is waiting to see how sales of the Dragon progress before putting money into further developments.

Speedy storage system

FOR THOSE of you who are fed up fiddling with the volume controls on your cassette recorder and can't bear the thought of seeing another I/O ERROR message flash up in front of you, Ikon Computer Products may have the answer.

Its Ultra Drive is billed as a "reliable, automatic high-speed storage" system at a price only slightly higher than a standard cassette recorder and well below the cost of a disk drive.

The Ultra Drive has a read/write speed of 1,200 characters a second (said to be 10 times as fast as a cassette recorder) and a capacity of approximately 200K per cassette. The Drive uses mini-floppy, data certified cassettes (the same size as those used in a dictaphone).

Ikon will guarantee for one year any cassettes purchased from it (though falling short of you stamping on them).

Audio quality cassettes can also be used on the Ultra Drive, but David Tucker of Ikon warns that the quality of these, when used with the Drive, is variable. He suggests that "you buy one and test it thoroughly before buying others".

The Ultra Drive costs £70.95 inclusive of interface, cables, operating system, micro-cassette and VAT, add £3.45 for jigs.

It is available direct from Ikon Computer Products, Kiln Lake, Loughborough, Leics LE12 5JG (tel 050-437 515). The cassette cost £3.30.

Ikon's products are not available in the shops as they have "dropped retailers in order to keep the price down as low as possible".

And while on the subject of storage systems, PFI Mag Systems is launching a new data storage system, Phycoxy. Unfortunately, at present this is only available for the BBC, though the company will be making a decision soon on which machines to extend the system to.

While acknowledging that the Dragon has said well in the past, the company is adopting a wait-and-see attitude.



"It's the simplest coding that takes them so popular!"

S-22 old

The arrival of the S-22 Toolkit could spell the "start of the end of menu driven programs" according to P F Hazleton of Ashby Computer Centre.

The S-22 Toolkit is a "very powerful" machine code programming aid "for use at all levels". It comes complete with plug-in cartridge, action card containing 8000 instruction codes, introduction and appendix books.

The S-22 is available direct from Ashby Computer Centre, 186 Ashby High St, Ashby, Leicestershire.

Wars, fantasies and adventures...

THE RANGE of fantasy and strategy games for the Dragon is increasing.

Two of Dragon Data's games, *Castle Island* and *Black Bandit*, already available in test versions, are to be re-released as animated graphics adventures, and two other games, *Sea Quest* and *Cherubians*, are new adventures titles.

Sea Quest involves searching for buried treasure and in *Cherubians* you have to follow the sailors to find the pot of gold at the end.

Also coming are two new arcade games. *Fruity*, a high-reaction game, is, as the name suggests, about a fruit machine and *Bumpers* involves extracting yourself

from a maze. Useful across like the ability to make yourself invisible add sparkle to the game.

Finally, from Lathorian comes news of *Johnny Reb*, its best-selling war game for the Spectrum, and recently converted to the Dragon. *Johnny Reb* (price £8.95) is a game for one or two players. After selecting sides and forces (comprising cavalry, artillery and infantry units) the screen changes from text to three-graphics.

A river separates the two forces and a standard is shown on each side of the river. The object of the game is to capture the enemy flag or alternatively to annihilate the opposition.

Super Writer

CARTHROD word processing is the latest business tool from Dragon Data. Its *Super Dragon Writer 2*, at £39.95, has all the usual editor commands and gives you a choice of screens. There is the 20 by 16 format screen, or, at the expense of 4K, you can use a high-res screen with upper case and lower case letters with true descenders.

With the hi-res screen you can choose four formats, one of which, the higher level, at 16 by 25, is used for retouching to see the overall shape of the text as it will appear.

And on the utility front, Dragon Data is planning to release a disk version of the *Dragon* system (text editor, assembler, monitor and disassembler). The program's author says this is the first assembly for the Dragon Data disk system with the facility to assemble directly from disk and to build up a library of subroutines.

Airwaves

CHIP SHOP listeners are going to have a choice of suppliers for the Basecode converters needed to run the radio broadcasts.

Last month we announced

that the BBC was to release a Dragon converter, but Grosvenor Software claims to have piped Radio 4 to the listening point.

Mike Kerry of Grosvenor Software explained that his *Dragon Basecode* was available now at the same price as the BBC's.

The Basecode is a complete receiver system, allowing users to record the 100% radio broadcast from the BBC on to a tape, and then play the tape into the Dragon under the control of the Basecode system, converting it to Base.

The system includes a library of Base subroutines to implement all the standard features of Basecode and a facility to support a 24-line by 40 character display. The standard Dragon screen acts as a window, and facilities are available to scroll the screen.

The *Dragon Basecode* is available from Grosvenor Software, 20 Grosvenor Road, Seaford, East Sussex BN25 2BS.

MODE 5

SOFTEN HAS announced the release of its new utility *MODE 5* which allows simultaneous use of text and graphics on the same screen.

The utility (price £5.95) is a feature which brings the Dragon into line with other machines (this mode is the one Dragon Data ordered from the Dragon).

Dragon network

IT'S NOW possible to network Dragons using a control unit from the Irish software company Lathorian.

Its tape driven system — consisting of a "black box", separate power unit and cables — can handle up to eight Dragons. But either boxes can be added to increase that number. The price for the *Dragon Network System* is about £15 in the United Kingdom.

Kevin Carr explained that the system's ideal application was in schools, where a teacher could pace programs to meet individual users' needs while keeping an eye on their progress.

Lathorian is also working on ways to link the Spectrum into the network so that a mix of machines can be controlled.

To back up this educational drive, Lathorian is releasing a £30 geographical tutorial on disk, covering the world in hi-res, with coordinates on all its continents and countries. Two geographical cassettes are also available at £7.95 each, covering Ireland and Europe.

But Lathorian is not ignoring the business market. Its disk based *Super File Management System*, at £35, provides over 100K for storing information with up to 240 characters per record. You can search the database in various ways: single condition, double conditions ("and") as well as "or", record number, and date or numeric.

It handles vertical and horizontal printing, as well as labels. Its word processing facility allows standard letters to be printed once merged with database items.

Spreadsheet functions are also included. As Kevin points out this gives the system a range of applications from keeping parish records to running a small business.

Also available, but on cassette, are *KD Base* at £9.95, storing up to 500 records; *Stock Control* at £18 more, recording information on up to 800 lines; and *PAF Analysis*, also £19.95, which handles up to 700 invoices.

For more details contact Lathorian at T Paddy Square, Blackrock, County Dublin.



A NEM 1400H resolution 12-inch computer monitor has been launched by Philips for £68.95. Although Philips has not actually tested the monitor with the Dragon, it has two sockets at the back, one of which is a separate yoke connector for composite video (as on the Dragon) and the other of which is for RGB. The monitor (see Philips V7901) has a green phosphor (to reduce eye-strain), an adjustable stand and an anti-glare tube to help cut down reflection.

The Countdown Begins

WIZARDRY	TEN LITTLE INDIANS	HEROES AND ADVENTURES	THE WIZARD'S MAZE	CIRCUS
THE TIME MACHINE	READABILITY EQUIPMENT	ESCAPE FROM PURGATORY	ARROW OF DEATH PART 1	ARROW OF DEATH PART 2
	<p>The whole range of Mystical Adventures for any Dragon will be available next month from your local computer dealer or direct from us. These assembler written graphics adventures* were previously only available for the Atari, BBC, Commodore 64, IBM, Spectrum and TRS 80. Now YOU can join the elite, get counting only 30 days to go. Mystical Adventures £9.95 each.</p> <p>* Any Dragon Mystical Adventure Pack will require graphics if used on a computer with 640K of memory. It is to used on a 512K computer to still be fair adventures.</p>			
THE GOLDEN EDITION				

CHANNEL 8 SOFTWARE
 81 Fitzwarp, Preston,
 Lancs PR1 6BB
 Tel: 05770 53057

Clubs

Each month we write about one particular club — if you think yours should be featured here write to Clubs Page, Dragon User, 12-13 Little Newport Street, London WC2R 3LP

The ranging role of the ACC

An introduction to the ACC by its chairman Rupert Steel

ARE you a member of a computer club? Have you visited your local club? Do you know where your local computer club is? If the answer to all these questions is "no", then you may be missing out on something which may breathe life and interest into your Dragon.

Computer clubs come in three varieties. There are national user groups, local computer clubs and closed computer clubs. The national user groups are associations of users of a particular computer system, and they tend to operate largely by a postal newsletter system, since they are too widely dispersed to have meetings. Some of the national user groups are run on a commercial basis, with one or two

people treating it as a full time occupation; others are run by a much larger number of amateurs, using what time they can find.

Another type of club is the "closed" computer club. This is the kind of club that is usually started at the place of work or a school, and caters exclusively for employees or pupils. Some such clubs do have an open "affiliate" membership (particularly the clubs attached to colleges or universities), but others do not. Such clubs work well in large organisations where people have free time in the vicinity of the normal premises, and I have had reports of clubs being formed among the British troops in West Germany, and at various army bases. Other institutions which have

brought forth computer clubs include banks and government departments.

But the main type of club I'm writing about is the local computer club. This kind of club has membership open to all those in the area who are interested in home computing or personal computers. Some local clubs are specific to a certain machine, but many others are of general scope, so allowing members to gain from the cross-fertilisation of ideas, and to see a variety of computer systems in action when considering a purchase, so what given us of a local computer club?

Well, that rather depends on the type of club it is, but two activities are very common. They are speaker meetings or lectures, where an outside speaker or a member of the club gives a talk of perhaps an hour on a subject about computers, and "workshop sessions" where members meet informally and spend time in hands-on use of computers. Some of the large local clubs have machine-specific sub-groups for discussion of, say, Dragon-related topics, with general meetings to discuss perhaps artificial intelligence or robotics. And many local clubs will run communications workshops.

So what is the ACC's role in all this? The ACC is the national Association of Computer Clubs, which is the representative and liaison body for computer clubs across the country. It is controlled by the computer clubs which it represents, through a representative council of club delegates. It is a non-profit making organisation.

One of the areas in which the ACC is active is in putting people in touch with their local clubs. The ACC maintains a club's database and we can give people the details of their nearest clubs. But of course we can't do this if people don't tell us about their clubs, so if you run a club please write to tell us about it and we will make sure it gets on the database.

The ACC is also active in the communications field. We run an area on *Praxis* called Club Spot 800 (part of the *Praxisnet* 800 database). The ACC is also involved with the national user groups at computer shows and exhibitions.

There is a club affiliation scheme, which allows clubs to affiliate to the ACC for a nominal fee of £8 a year (to cover our administrative expenses). Affiliated clubs are able to send a representative to the ACC Council and can take part in Club Spot. We are also arranging an insurance scheme for affiliated clubs.

If you are running a local computer club, wanting to find a nearby computer club or thinking of starting your own computer club, then please write to me. The ACC has a Club Information Kit available free which gives advice on setting up and running computer clubs, as well as the database enquiry service. Please address any enquiry resulting from this article to me, Rupert Steel, 17 Lassic Park Crescent, London SE26 6HH and I will pass it on to the correct officer. ■

Dragon clubnet

Berkshire: J R Griffin wants his small group to get bigger — write to J Griffin Road, Brinkell Estate, Slough, Berkshire, or telephone Slough 352585.

Cornwall: 1659 User Group, c/o Paul Hills, 26 William Road, Looe, Cornwall — international contact group.

Derbyshire: Dragon Owners' Club, Dragon Dragon, PO Box 4, Airedale, Leeds — publishes Dragon's Teeth.

Devon: Exham Computer meets every Wednesday evening at the Golden Lion, New Road, Exham — write to Ian Chappell, 70 Brookside Court, Exham, Devon, or telephone Exham 55334.

Gloucester: Dragon 32 Users' Club, Games and Computers, 31 North Street, Warham, Dorset.

Essex: Drag Runners, Dragon Independent Owners' Association, Dated House, Newen Road, Rayleigh, Essex.

Hampshire: Paul Kennedy wants to form a users' group. His address is 81 Broadmeads, Amesbury, Glos. Wiltshire, Telephone Wex 55554.

Leicestershire: Melvyn Franklin, North West 775-60 Users' Group, 40 Canewdon, Weymouth, Dorset. Leicestershire growing number of Dragon users, meets monthly at their near Macclesfield and publishes newsletter.

London: 18 Users Group, c/o Plover Road, Harrow, Middlesex — publishes, 18 Macclesfield and meets monthly at Central London locations, write to the group for further details — all 8000 members welcome.

Northamptonshire: Dragon User Group meets on Wednesdays at the Congregational Centre, Castle Gate, Northampton — contact Mike Johnson, Rutland, 18 Stamford Close, Brigh-

ton, Northampton or telephone Northampton 22441.

Northumbria: Tony Beckford, Tame Computer Club, 17 Adams Cross, Tamworth, Staffordshire — all affairs club including 18 Dragon owners, meets fortnightly.

Northamptonshire: Donagh Computer Club meets in the Kings Road of Portbury House on the first and third Wednesdays of each month — contact 45 telephone at 18 Parnall Drive, Cherry Hill Estate, Donagh, Worcester, or telephone Donagh 775570.

Yorkshire: CILS User Group, 1st Floor, 14 New North Parade, Huddersfield — meets five times a week (Tuesday and Wednesday evenings plus Sunday mornings), telephone 0484 515170 during the day or 0484 567330 after 5pm.

Yorkshire: Sheffield Dragon Users' Club meets monthly (alternating between a pub and Sheffield City Polytechnic) — contact Richard Crompton, 121 Hamphreys Valley Road, Rotherham or telephone Rotherham 515545.

Channel Islands: Dragon User Group, c/o M J Buxton, Hemsley, St Peter's Valley, St Lawrence, Jersey.

Southland: David Anderson, Scottish Dragon Club, 1 Parker Street, Edinburgh.

Southland: Stewart Hutchinson, 128 Pitlochry Terrace, Banff, Glasgow or telephone Glasgow 566510.

Wales: Dragon Users' Club, Dragon Data, Rangi Industrial Estate, Manxan, Port Talbot, West Glamorgan — home of the Dragon and publishers of Dragon World.

Wales: Steadrick Hensley is looking for Dragon projects to swap ideas and programs with. His address is 1 rue des Paveses, 56000 Charleville-Mézières, France.

New Zealand: I G Coker wants to start a Dragon and Colour Computer users club — his address is 12 Colquhoun Street, Whangape, New Zealand.

South Africa: Ian McCall invites other SA Dragon owners to contact him at 35 Silver Road, Rondebosch, Cape Town.

3D SEIDDAB ATTACK

NOW AVAILABLE FOR THE DRAGON 32



Defend your city from the SEIDDABS in your Mini tank. Incorporates amazing moving 3D graphics.
£7.95

£6.95

DRAGONFLY II

3D flow, real time flight simulation. Two scenarios, take off tests, adjust aim, navigate using waypoints, plot land, fly with on-board display of data and vectors. Instruments: Alt 1, 450 Yb, Alt, G.S. 1, 8000 CAS, 11000 1000, 8000 (8000, AP and 10000).

3D SPACE WARS

Fast and furious action. JoyStick or keyboard control. Locate the SEIDDABS on your galaxy screen. Score the star streaks/missions for your first eight of the enemy. Track their course and react rapidly as they fly towards you. Let them grow in your sights and guide the 3D. Battle as they come into range.

£ 7.95



HEWSON CONSULTANTS

Hewson Consultants
100 West Trading Estate
Aston
Birmingham B4 7DQ
Tel: 0202 840000

DRAGON 32 OWNERS

Make your Dragon turn into a real computer with the new Double-Density Delta Disk System.

The EcoProx Risk System Shows You

- An affordable disk system.
- Powerful Delta disk commands.
- Lets you produce and handle random access files as easily as serial files.
- Random sequential and indexed file handling.
- Simple plug into Decagon.
- There are no **HARDWARE** MOOS needed to run DELTA.
- Easily expandable 500K to 1.4 megabyte.
- ON LINE storage.
- Full range of business utility and games software. **AVAILABLE NOW!**

**FULL
RANGE OF
BUSINESS
SOFTWARE
AVAILABLE.
SEND SAE
FOR DETAILS**

DELLA CARRIER - provides DELLA Mail Operating System, User Manual, documentation disks etc.	\$198.00
DELLA 1 - (DELLA) Carriage, User Manual, a single-sided 40 track (HDD) carriage plus cables	\$264.00
DELLA 2 - as DELLA 1, but with a single-sided 40 track (SSHD) carriage	\$302.00
SE interface cable (supplied with DELLA 1 or 2)	\$9.00
SECUREWARE (if assembled) Data Administrator - Integral with DELLA	\$24.00
DELLA ACCOUNT Full form package for DELLA	\$74.00
INFORM - On-line Management System commissioned especially for (M) S Systems	\$99.00

NEW

FLEX FOR THE DRAGON USING DELTA

FLEX is an internationally accepted Disk Operating System. It features dynamic file allocation, random and sequential file handling, executive file capability, auto drive switching, file locking, space compression, user environment control, error messages in English and over 20 commands for disk operation.

A large number of high quality software packages are available to run under PLEX ranging from spreadsheets to word processors, compilers to new languages. PLEX is intelligent, friendly and efficient disk based operating system. PLEX is available now for the IBM DRAUGCON using PRIMER3® (ML) disk system. It is supplied complete with a 300 page manual. An editor and assembler are both supplied with the software.

FLOR is the registered trade name of Technical Systems International, Inc., 200, 201 Ave. "C" and "D",

44

DOODLE MASTER

Abstract. *Abstract* provides the C# compiler (Roslyn) programmer with programming facilities for the definition of members, etc.

- **2. A major motivation for the definition of graphics languages**
 - **2.1. To improve the productivity of the programmer** (the programmer should not be asked to write in BASIC or FORTRAN)
 - **2.1.1. To make the program shorter**
 - **2.1.2. To make the program easier to read**
 - **2.1.3. To make the program easier to write**
 - **2.1.4. To make the program easier to debug**
 - **2.1.5. To make the program easier to maintain**
 - **2.1.6. To make the program easier to port**
 - **2.1.7. To make the program easier to test**
 - **2.1.8. To make the program easier to document**
 - **2.1.9. To make the program easier to learn**
 - **2.1.10. To make the program easier to teach**
 - **2.1.11. To make the program easier to use**
 - **2.1.12. To make the program easier to understand**
 - **2.1.13. To make the program easier to communicate**
 - **2.1.14. To make the program easier to share**
 - **2.1.15. To make the program easier to reuse**
 - **2.1.16. To make the program easier to integrate**
 - **2.1.17. To make the program easier to extend**
 - **2.1.18. To make the program easier to modify**
 - **2.1.19. To make the program easier to adapt**
 - **2.1.20. To make the program easier to evolve**
 - **2.1.21. To make the program easier to grow**
 - **2.1.22. To make the program easier to change**
 - **2.1.23. To make the program easier to update**
 - **2.1.24. To make the program easier to replace**
 - **2.1.25. To make the program easier to delete**
 - **2.1.26. To make the program easier to add**
 - **2.1.27. To make the program easier to subtract**
 - **2.1.28. To make the program easier to multiply**
 - **2.1.29. To make the program easier to divide**
 - **2.1.30. To make the program easier to power**
 - **2.1.31. To make the program easier to root**
 - **2.1.32. To make the program easier to log**
 - **2.1.33. To make the program easier to exp**
 - **2.1.34. To make the program easier to sin**
 - **2.1.35. To make the program easier to cos**
 - **2.1.36. To make the program easier to tan**
 - **2.1.37. To make the program easier to cot**
 - **2.1.38. To make the program easier to sec**
 - **2.1.39. To make the program easier to csc**
 - **2.1.40. To make the program easier to sinh**
 - **2.1.41. To make the program easier to cosh**
 - **2.1.42. To make the program easier to tanh**
 - **2.1.43. To make the program easier to coth**
 - **2.1.44. To make the program easier to sech**
li>
 - **2.1.45. To make the program easier to csch**
 - **2.1.46. To make the program easier to asinh**
 - **2.1.47. To make the program easier to acosh**
 - **2.1.48. To make the program easier to atanh**
 - **2.1.49. To make the program easier to acoth**
 - **2.1.50. To make the program easier to asech**
 - **2.1.51. To make the program easier to acsch**
 - **2.1.52. To make the program easier to asinh**
 - **2.1.53. To make the program easier to acosh**
 - **2.1.54. To make the program easier to atanh**
 - **2.1.55. To make the program easier to acoth**
 - **2.1.56. To make the program easier to asech**
 - **2.1.57. To make the program easier to acsch**
 - **2.1.58. To make the program easier to asinh**
 - **2.1.59. To make the program easier to acosh**
 - **2.1.60. To make the program easier to atanh**
 - **2.1.61. To make the program easier to acoth**
 - **2.1.62. To make the program easier to asech**
 - **2.1.63. To make the program easier to acsch**
 - **2.1.64. To make the program easier to asinh**
 - **2.1.65. To make the program easier to acosh**
 - **2.1.66. To make the program easier to atanh**
 - **2.1.67. To make the program easier to acoth**
 - **2.1.68. To make the program easier to asech**
 - **2.1.69. To make the program easier to acsch**
 - **2.1.70. To make the program easier to asinh**
 - **2.1.71. To make the program easier to acosh**
 - **2.1.72. To make the program easier to atanh**
 - **2.1.73. To make the program easier to acoth**
 - **2.1.74. To make the program easier to asech**
 - **2.1.75. To make the program easier to acsch**
 - **2.1.76. To make the program easier to asinh**
 - **2.1.77. To make the program easier to acosh**
 - **2.1.78. To make the program easier to atanh**
 - **2.1.79. To make the program easier to acoth**
 - **2.1.80. To make the program easier to asech**
 - **2.1.81. To make the program easier to acsch**
 - **2.1.82. To make the program easier to asinh**
 - **2.1.83. To make the program easier to acosh**
 - **2.1.84. To make the program easier to atanh**
 - **2.1.85. To make the program easier to acoth**
 - **2.1.86. To make the program easier to asech**
 - **2.1.87. To make the program easier to acsch**
 - **2.1.88. To make the program easier to asinh**
 - **2.1.89. To make the program easier to acosh**
 - **2.1.90. To make the program easier to atanh**
 - **2.1.91. To make the program easier to acoth**
 - **2.1.92. To make the program easier to asech**
 - **2.1.93. To make the program easier to acsch**
 - **2.1.94. To make the program easier to asinh**
 - **2.1.95. To make the program easier to acosh**
 - **2.1.96. To make the program easier to atanh**
 - **2.1.97. To make the program easier to acoth**
 - **2.1.98. To make the program easier to asech**
 - **2.1.99. To make the program easier to acsch**
 - **2.1.100. To make the program easier to asinh**
 - **2.1.101. To make the program easier to acosh**
 - **2.1.102. To make the program easier to atanh**
 - **2.1.103. To make the program easier to acoth**
 - **2.1.104. To make the program easier to asech**
 - **2.1.105. To make the program easier to acsch**
 - **2.1.106. To make the program easier to asinh**
 - **2.1.107. To make the program easier to acosh**
 - **2.1.108. To make the program easier to atanh**
 - **2.1.109. To make the program easier to acoth**
 - **2.1.110. To make the program easier to asech**
 - **2.1.111. To make the program easier to acsch**
 - **2.1.112. To make the program easier to asinh**
 - **2.1.113. To make the program easier to acosh**
 - **2.1.114. To make the program easier to atanh**
 - **2.1.115. To make the program easier to acoth**
 - **2.1.116. To make the program easier to asech**
 - **2.1.117. To make the program easier to acsch**
 - **2.1.118. To make the program easier to asinh**
 - **2.1.119. To make the program easier to acosh**
 - **2.1.120. To make the program easier to atanh**
 - **2.1.121. To make the program easier to acoth**
 - **2.1.122. To make the program easier to asech**
 - **2.1.123. To make the program easier to acsch**
 - **2.1.124. To make the program easier to asinh**
 - **2.1.125. To make the program easier to acosh**
 - **2.1.126. To make the program easier to atanh**
 - **2.1.127. To make the program easier to acoth**
 - **2.1.128. To make the program easier to asech**
 - **2.1.129. To make the program easier to acsch**
 - **2.1.130. To make the program easier to asinh**
 - **2.1.131. To make the program easier to acosh**
 - **2.1.132. To make the program easier to atanh**
 - **2.1.133. To make the program easier to acoth**
 - **2.1.134. To make the program easier to asech**
 - **2.1.135. To make the program easier to acsch**
 - **2.1.136. To make the program easier to asinh**
 - **2.1.137. To make the program easier to acosh**
 - **2.1.138. To make the program easier to atanh**
 - **2.1.139. To make the program easier to acoth**
 - **2.1.140. To make the program easier to asech**
 - **2.1.141. To make the program easier to acsch**
 - **2.1.142. To make the program easier to asinh**
 - **2.1.143. To make the program easier to acosh**
 - **2.1.144. To make the program easier to atanh**
 - **2.1.145. To make the program easier to acoth**
 - **2.1.146. To make the program easier to asech**
 - **2.1.147. To make the program easier to acsch**
 - **2.1.148. To make the program easier to as**

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 109–116

TOOLKIT FOR DRAGON 32

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 111–118

- Full screen active offering support.
- High RESOLUTION (x10).
- Full screen low resolution graphics screen.
- Full usage of IBM/MS/UNIX commands with standard IBM/UNIX syntax.
- GIVE MATHS RESULTS fully linked to your IBM/MS/UNIX BASIC.
- VARIABLE SCOPES-COLOR screen.
- Superf TRACK command which gives top-right of screen only. Thus keeping graphics 'near edge'.
- MATHS and RESIZE commands for window position modification.

Available in [http://www.elsevier.com/locate/journal](http://www.elsevier.com/locate/locate/journal)



PREMIER

[illegible][illegible]



ames

A name to PLAY with



DEATH CRUISE

By Lee S. Schwartz
An exciting action-adventure set in the Caribbean. You must reach the treasure before the pirates do. A completely new game for 1-4 players.



CASTLE ADVENTURE

By Carol Johnson
A classic quest adventure. You must rescue the Queen of Camelot. A completely new game for 1-4 players.



I CHING

By David Smith
This program is a simulation of the I Ching. You can use it to generate random numbers and to generate random numbers.



UXB

By Patrick Fagan
This is the most fun game of the year. You can use it to generate random numbers and to generate random numbers.

SUPER DRAGON OFFER:

This is the most fun game of the year. You can use it to generate random numbers and to generate random numbers.



£6.95

Computer FUN...available NOW!

Daunting software scenarios

Follow John Scriven as he ventures into the software world to fight off thugs, steal a secret weapon, free the workers and much more . . .

IN RECENT MONTHS I've seen quite a selection of so-called educational software that should! I have escaped from the grasp of the programmer. Perhaps in the distant past it might have been satisfactory to use computers to administer table tests or to demonstrate how to "do long multiplication". When a computer is used in the field of education, whether at school or at home, it needs to be used creatively, and needs to do things that could not be achieved in other ways. Although the programs that I've looked at this month are not advertised as being "educational", there are some that deserve a place in an educational collection far more than some that are sold as such.

One company that usually produces interesting programs is Shards Software. Following on from its earlier epic, *Pearl-gem's Diary*, Shards has just released two adventures that follow a similar structure. Both consist of more than one program, and in *Jaws Star*, clues discovered in early sections are needed to achieve the final goal.

Mystery of the Jaws Star begins in Bristol, where you are shown a parchment that has been hidden in an old sea-chest for many years. Given £12,000 to begin with, you have to equip yourself for an expedition to find the fabled ruby, the *Jaws Star* of the title.

Your first expense is in assembling the jumbled message from the chest. The pieces are put out like those little plastic puzzles where you rearrange the tiles, and in this version you can snap pieces until the message is readable. To help you solve the problem, you are allowed to peep at the finished mission, but naturally nothing's for nothing, so each peep costs you £10.

Once you have worked out the dying message from the parchment, it crumbles into dust, and you have to repeat the procedure with the leverette map. If you have seen *Razzer* from Shards, then you will see that it has cleverly incorporated the graphics routines from the earlier program in *Jaws Star*.

The second sub-program takes place in London, where being expensed also costs

per day. There are more than 30 different places you can visit in order to extract the vital information necessary for your trip but unsuccessful locations will cost you a day's expenses. As each fresh place appears on the screen, pressing the space bar reveals details, and whether any information is forthcoming. You certainly learn about some of the more interesting places to visit in London, from Maymorn House to the National Maritime Museum, and this increases the educational value of the program.

Deep-Sea diving

There are two main sections that allow you to explore an area of interests and to finally clue to find the true mystery behind this adventure. Although this doesn't stir the mind as much as most text adventures, it's fun to play and is the sort of software that should be used in schools, rather than the boring drills that seem to abound under the name of educational software. My one criticism is that once you reach the end, there's nothing left but to play an identical game. This, however, is a criticism of many adventure games, and it's not so early that you'll reach the end in one evening.

North Sea Oil is a simulation program that puts you in the role of the Offshore Installation Manager of a North-Sea drilling rig. This position entails getting a supply vessel to the rig and organising the workforce in the most economical way possible.

I didn't find this as interesting to play as *Jaws Star*, and I couldn't swear as to the accuracy of the simulation. But the program is well-written, and is a combination of a graphic adventure with a role-the-economy kingdom-type game, and would be popular with older children who want something more subtle than mass alien-blasting.

Knowing that I'd already played all three editions of Dan Diamond's exploits, this month was looking a little flat. Luckily Salamander Software has produced another pair of strange adventures to entertain those of you who have a sense of humour.

The Cricklewood Incident concerns



Mystery of the Jaws Star—deciphering an ancient past

the exploits of a certain Arnold Q 'sole-shrangler, based millennium economic whose one aim in life is to seek the Holy Grail before entering to the privacy of his padded cell. The screen display is used in a similar, though rather more complex way to that employed in the *Dan Diamond* trilogy, and is split into five sections: a scene description, a list of possible exits, a health indicator, an area for descriptions of objects and a section for messages and inputs. At the start you can choose a suitable persona, so ignoring the apper-

Under review

Shards Software
108 Eton Road
Wood
Epsom

Salamander Software
17 Norfolk Road
Brighton

Abacus Software
21 Union Street

Mystery of the Jaws Star
£7.95
North Sea Oil
£5.75

The Cricklewood Incident
£7.95
Wings of War
£7.95
Turtle Graphics
£9.95

Stargate
Willy's Perseus

THE MYSTERY OF THE A STAR NOW LOADING



**COPYRIGHT 1984
SHARDS SOFTWARE**

game is the first daunting task as you journey in search of the sacred ruby.

turtle to be Gheorgis Khan or Geoff Boycott, I adopted the role of Uther Wally (no comments, please!) and dove into the padded cell. After walking down a tree-lined road for some minutes, I met a Hell's Angel who challenged me to a fight. Choosing from a menu of unpleasant things I waved my sword at him and he ran off, leaving behind 16 pence. As I stood there counting my ill-gotten gains, another Angel came up and nudged me.

Shortly after this I was abducted by an alien spacecraft and jetted into a cybers-

pace. Soon after that, I pressed a button that I'd been warned not to touch and managed to lose the program. If you think you can cope with such lunacy coupled with a very high frustration level, then you may enjoy this program. I certainly found it amusing, but was also tempted on numerous occasions to melt the cassette down into something more useful, like a paper weight.

Wings of War is also a text-only adventure using a formatted display, but this time the theme is more serious, and is set in occupied France during the last war. I try more serious, because nothing that comes from Brighton is ever completely real it seems, and there is a lot of tongue-in-cheek humour present here.

In a starring role as Lieutenant Roger Wilcox, it is your mission to be parachuted down near a chateau where a new German secret weapon is being developed. Having found your possessions which are scattered through the dark wood, you can enter the chateau and attempt to collect the necessary bits and pieces which make up the bomb. If you reach this stage you can make your way to safety back in England.

If you prefer something slightly easier than *The Cocklewood Incident*, then you will probably enjoy pitting your wits against the Nazi menace in *Wings of War*. If you

play these two adventures, it's a good idea to regularly save your position, as destruction awaits you round every corner.

Also from Salamander this month comes one of those monster video boxes containing a five cassette. In this case it can be justified to a small degree by the instruction booklet which is almost A4 in size. The program in question is **Turtle Graphics**, the first implementation I have seen for the Dragon.

Based on the graphics routines from the language Logo, turtle programs can demonstrate basic programming procedures far better than a language such as Basic. If you want to know the story behind Logo, you can do no better than to get a copy of Seymour Papert's book *Mindstorms*, which describes the experience of children learning to program using Logo in the States. I am glad to see that Salamander has resisted the temptation to call this program Logo, like some firms who produce turtle graphics programs for other micros. A full implementation of Logo is far more than just turtle graphics, although this is an important facet of the language.

On the move

The idea behind Turtle Graphics is that you control a screen turtle, and give it commands which it obeys, such as forward, or right. As it moves, it leaves a mark to show its trail. Because of this, and its innate slowness, *Small Graphics* would probably be a more accurate name. In fact, this version is not too slow, especially if your Dragon can operate faster by using the infamous high speed (POKE).

Not only can the turtle move in immediate mode, it can also learn to obey a series of instructions entered as a little program. In this respect, it resembles the toy, *Logo*. Each mini-program can have a name, as you can define a word, **SQUARE**, that consists of the commands **F20, F90, F20, F90, F20, F90, F20, F90**. (F stands for forward, and R for turn right so many degrees.) To make it simpler, you can put the commands in a repeat loop: **4*F20 F90**. If the word **SQUARE** was saved in the internal library, then entering **4*SQUARE** would produce a little square in the middle of the screen. The word **SQUARE** can now be used in other definitions.

In *Mindstorms*, Papert uses the example of a square and a triangle being defined, and the two being combined to make a word called **HOLISE**. This figure is repeated across the screen in the word **STREET**, showing that definitions can be built up and stored. The program *Turtle Graphics* also allows the use of variables and random numbers, and both the screen mode and colours can be changed during the course of the program and a permanent record saved if you have a printer or plotter attached. The accompanying booklet is well-produced, and contains both an inspiration section and a reference section illustrated with little cartoons.

The Dragon is an ideal computer to use for this sort of program, as separate screens can exist in memory, and viewing the command or library area doesn't

**Flamboyant
Bury
Lancs**

**Firstaid
£7.95 each**

**Gable Software
52 Ladbroke Road
Luton
Beds**

**Living Stone
£8.75**

**Dragon Data
Kendal Industrial
Estate
Morgon
Port Talbot**

**Lunar Rover Patrol
£10.95
Blot Head
£7.95**

**Wellbrooksoft
The Stairs
Peterchurch
Herefordshire**

**Witchway
£8.40**

and the drawing screen. As a drawing aid, this program falls short of specialist graphics utilities, but this is not where its main value lies. Apart from learning about simple programming, elementary geometry is used in a real environment that results in an interesting and very worthwhile cassette.

Arcade action

After the mind-banking of adventure programs, and the fun of training turtles, I thought I'd relax one evening and check out the latest arcade games. It was not as pleasant as I'd anticipated, however. The first cassette I picked up was *Stargate* from Abacus Software. When the Dragon first appeared in the dim and distant days of 1982, I used to curse the cassette operating system that produced so many stuff loads. Only the early BBC models and Orion seemed worse, and I ended up buying a var-speed cassette deck with separate tone controls. Since then, I've rarely found a tape that failed to load on some setting, and indeed most tapes now load first time. After struggling with *Stargate* for 20 minutes, it finally loaded at full volume and tone, and an increase of 10 per cent in tape speed. Unfortunately, it wasn't worth the effort. The screen display is minimal — just a square in the centre designated the stargate, and an enemy ship that appears at random firing at one of the sides. If you fire back, your shots prevent the other ship from firing you. There is no other display, and the game continues until you give up out of sheer boredom. There seemed to be a fault in the review copy, in that there was no on-screen scoring, so it was impossible to see how well I was doing. The instructions on the cassette sleeve were also different to those on the cassette itself.

After this experience, I faced *Willy's Revenge*, also from Abacus, with some trepidation. In fact, it's about a hundred times better than *Stargate*. Similar to the arcade game of *Captain Jack*, it involves chasing round a garden squashing any creatures that appear in your path. As you go over more things, the speed increases, so does your length, and the game gets more difficult. You lose a life each time you double back on yourself or run into the garden wall. I think I prefer the version which pit you against the computer rather than the one, but although not outstanding, it's a vast improvement on *Stargate*.

My favourite Abacus game this month is *Fireball*. The object is to climb to the top level of a burning building by means of several ladders and to fit a fire hydrant on the top floor with a hammer. On the way, you have to pass flames that threaten to engulf you, and once the fire is out, you can fetch a ride on a helicopter. This is an excellent game that is best done by the four documentation on the cassette sleeve. Although it explains the idea behind the game, several of the features like some working out. It's possible to knock out the flames with your pickaxe or hammer, but this isn't even mentioned in the notes. If you can cope with this small difficulty, then the game can be recommended.



North Sea Drift: navigating a supply vessel to the rig

I was under the impression that *Livingstone* was a famous Victorian missionary and explorer. Apparently *Living Stone* is also "the most challenging game yet written for any home computer". Seeing something like this inscribed on the back of any cassette is likely to elicit the response "Oh yes?" from me, particularly in my more cynical moments. This game from Cable Software does have its moments, however, and while I would disagree with their description, I do find it an interesting and original game.

The screen shows a complex arrangement of seven overlapping 10-sided figures. These in turn contain a total of 30 squares, 24 triangles and seven hexagons. Taking it in turn, the object is for two players to place 15 stones on the vertices (corners) of the polygons. This is achieved by positioning cross-hairs over the required position and pressing the fire button on the joystick. If you place your pieces on the corners of a square, you are allowed to move two of your opponent's pieces; if you complete a triangle, you can move just one. The object of the game is to complete any of the hexagons. If this isn't achieved in the first stage (while you still have fresh stones to place on the board), then you are allowed to slide existing stones from one position to the next, until

someone succeeds in completing a hexagon.

You can play against another human, or against the computer, and if you enjoy board games, this is certainly one to add to your collection.

Meaning

Dragon Data has been lying low for a couple of months, but it has recently come up with some rather good software. This month I've been looking at some arcade games that originate in the States, as do most of Macaulan's programs.

Lunar Haven Patrol gives you the opportunity to drive a moon buggy over a sideways-winding and gently undulating terrain. Obstacles litter your path, and some of them need to be jumped over, while others can be blasted out of the way with a laser cannon. There are five stages with different obstacles and different backgrounds. Although the program is called *Lunar Haven*, and has an earth hanging in the sky, the scenery is rather too much for the moon, and comes complete with lunar barrel houses in little estates.

If you drive into a crater, the buggy disappears, and a pair of wheels roll sterningly away from a small explosion. At this point, you clark off in a fresh vehicle from the stage you reached, which makes

14 DEC
14 DEC

NORWAY

DENMARK

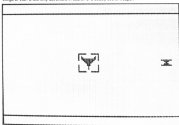
a pleasant change from all those games that send you back to the beginning each time you crash. The stage in the course you're at is shown at the top of the screen, as is your score and the number of buggies remaining. Apart from the oversized packaging and the price (£10.95), this is an entertaining arcade game, and should appeal to a wide audience.

Blue Head, also from Dragon Data, is nothing to do with Ian Dury and his rhythm stick, but is instead a game played on a grid of diamonds. Because of the way in which they are coloured, they look like a pile of building blocks in 3-D. Controlling a small figure with the joystick, the aim is to jump on to as many of the blocks as possible, while avoiding other creatures who scurrying happily around the playing area. As you land on a block, its colour turns from yellow to blue, and if you land on all of them, the screen changes colour, and the game rolls up. Although not really original (I seem to remember seeing something like it on an arcade machine last year), it's a novel game for the Dragon, and again, my colleagues are not levelled at the program, but at the high price and the superfluous packaging.

Both these Dragon Data games have large explanatory booklets, but these only contain about 300 words each, which

Wings of War

Wings of War: a text-only adventure in search of a deadly secret weapon



Starlight: minimal screen display from Advance Software



Put out a burning building in Fireball

would fit inside the back of a standard cassette case. I would have thought the size of case used by companies like Galaxian and Premier, about three and a half by five inches, was large enough to contain ample documentation while still being small enough to fit comfortably in a rack.

Narration?

The last cassette I've looked at is **Wildaway** from Wellenstockoff, a new name to Dragon owners. This is a graphic adventure game that involves making your way round a high resolution maze. The object of the game is to "free the workers in the mines from their chains", a noble societal aim if ever I heard one. Preventing you from succeeding in this task is the witch Heade (perhaps calling her Maggie was too near the mark for the author).

After loading, you have to wait for some time for the maze to be generated, and this is necessary each time you get squashed by the walls, which is frequent and therefore most irritating, as is the fact that you have to sit through the "story so far" screens that are shown at the start. The maze generation itself is fine, as is the idea of trying to find hidden gates in the walls. If you are prepared to stick at it, you will eventually find your way to the middle and the Hen House, although the trip is anything but easy. I found I was getting tired with no warning as I made my way through the maze, which would be fine if you could restart the game immediately, but is frustrating when you realise that you have to wait for longer than a minute each time you have to play again. In spite of these minor irritations, the game should keep you entertained for many hours, and there are certainly some strange surprises waiting for you as you get closer to the game's centre.

In the maze, I've been pleasantly surprised this month with the quality of the software. Even those tapes that get the "Lemon of the Month" award show more promise than the average attempt a year ago. If the standard keeps rising, everyone should benefit.

Next month I've been promised an exciting collection of new titles, which should be worth waiting for. I've just had a sneak preview of Junior's Revenge which looks very promising. King Kong's son getting his own back on wicked Luigi, and so on, so I'm just off to buy a bunch of bananas in case I need a tribe to get started next month! ■

EDIT+

EDIT+ is a Full Screen Editor (and Programmer's Tool Kit). It's an excellent aid for writing programs in BASIC and is easy to use for the novice as well as the experienced programmer. EDIT+ includes all the facilities of HI-RES. Up to 23 lines of your program are displayed on the screen and can be changed by overtyping, inserting, or deleting characters. Functions include: Find String, Change String, Copy Text, Goto Specified Line, Scroll Up/Down, Append From Tape and Enter Basic Command. No Dragon is complete without an EDIT+ £24.95

HI-RES

Plug the HI-RES cartridge into your DRAGON and you will immediately see the improvement. The screen displays 24 rows of 54 characters with proper lower case and BASIC works as normal but with extra features. Selectable character sets (English, French, German, Danish, Swedish, Italian, Spanish, SPORTE). Graphics, Redefinable Characters, Improved keyboard action with interrupted allows faster typing. Graphics and text can be mixed on the screen. Suitable for educational and business use. £25.30

SOURCE TAPES

The following programmes contain both source and object code. They can be used in conjunction with DASM or on their own as individual programs. It's a great way to build up your software library. Each tape represents excellent value at only £5.99 each.

1. DEASSEMBLER
2. GAME OF LIFE
3. HI-RES SCREEN DUMP FOR EPSON
4. HI-RES SCREEN DUMP FOR SORDINA

EXTRAS

- DUST COVER inc p4p £2.99
 PRINTER LEAD inc p4p £14.99
 MONITOR/SOUND LEAD inc p4p £3.99
 Super inexpensive 34 inch Colour Monitor with integral sound ideal for DRAGON and most other applications
 DRAGON DSC (HMC) complete inc p4p £269.00

only £225.00

DASM

DASM is a versatile assembler, designed especially for ease of use on the DRAGON and allows you to assemble machine code while still retaining the full use of BASIC. Supports all 6809 instructions and modes. Allows any length for labels (the first 5 and the last character, are used). Full support for output to printer. Recommended for the beginner. £18.95

DEMON

A powerful machine code monitor which allows you to delve into the intricacies of your DRAGON as well as helping you to debug your machine code programs (and BASIC programs using PEEK and POKE). Includes: Examine/Change memory, Examine/Change registers, Point Screen, Set Breakpoints, Test Memory. An essential tool for all machine code users. £28.95

DASM/DEMON

It has all the features of both DASM and DEMON in one package. DEMON is the natural partner to DASM, complementing each other perfectly. Write, test and use your programmes without the bother of reloading. It is extensively featured in the new book by Ian Seclair on Dragon Machine Code. It is the ideal combination for the machine code user. £39.45

BUSINESS SOFTWARE

The following MS1 programs are now available for use on cassette with the HI-RES 50 by 24 Screen.
 Database, Business Accounts, Stock Control, Invoices/Statements, Invoices/Address Book.
 Also available: Home Accounts, MS1 Calc. £19.95

BOOKS

- Books and Tapes
 Introducing Dragon Machine Code by Ian Seclair £7.95
 Advanced Sound and Graphics £5.95
 The Working Dragon 32 £5.95
 Programming the 6809 Zaks £12.95
 6809 Assembly Language Prog. £12.95
 Universal
 Postage on books: 50p per book except Zaks/Universal £1 maximum £1.50

DYNAFAST

SPED UP!
 Compiles any working BASIC program into superfast machine code. Write & test programs as usual then compile with DYNFAST to achieve maximum time saving during operation.
 DYNFAST - BASIC COMPILER
 Disk £29.95, CASH £29.95
 SPECIAL INFO. OFFER INCLUDES DYNFAST & DYNASORT

DYNAMISER

MAKE ROOM!
 DYNAMISER OPTIMISES YOUR BASIC PROGRAM BY:
 1) removing redundant space and characters
 2) deleting unnecessary REMS
 3) combining several lines into one line
 Save space, protect your program (and speed it up!)
 DYNAMISER - BASIC COMPILER £5.99
 inc. TAPE OR DISK

DYNAXREF

ANALYSER
 DYNAXREF analyses a basic program and displays all references to variables & labels within the program. Now that you can tell where your program is updating variables it's easier to correct errors.
 DYNAXREF - BASIC CROSS REFERENCE
 £5.99 TAPE OR DISK

DYNAFIX

- full screen display & edit of sectors by the name or sector number
 - full screen display & edit of memory
 - printer dump
 - strong search routine
 - copy disk to tape, tape to disk
 - disassemble from disk
 - list BASIC programs
 - memory dump
 DYNAFIX - DISK FILE £24.95
 DASM/DEMON available on disk £19.95
 HI-RES/EDIT+ available on disk £24.00
 - upgrades available from cartridge

GRAPH DRAWER

For HI-RES or EDIT+, draw bar charts direct to screen and printer. Print module for Epson 880 or FX printer included.
 Introductory offer of £24.95 if purchased with HI-RES or EDIT. £19.95

FOR FAST MAIL ORDER SERVICE CONTACT COMPUSENSE

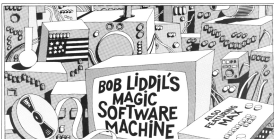
*AVAILABLE AT LARGER BRANCHES OF BOOTS



POSTAGE & PACKING PER ORDER

COMPUSENSE LIMITED

Room 105, 2880 Green Lanes, Potters Green, London NE11 5AA
 Tel: 01-862 0466/4666, 24hrs
 Telex: 9812271 GPCOM G



WHEN YOUR best friend is a sentient computer program capable of downloading you into the actual world of Rancor or Dankey Kong you sleep very lightly. He has the entire house wired for speech input and output so that he may communicate with me if needs be. This situation is stressful during bedtime or drink tea. But Max likes to wake me up early in the morning with yappings at bump up. Even that is acceptable. I do tend to lounge about. But this morning I wake up on a strange planet and things like that happen my day.

I do not immediately recognise this place. There are so many space-orientated programs in the Dragon/Tandy Colour Computer portfolio that one tends to lose track. Let's see, it can't be the Domes of Kilgar's adventures. There are no domes. It can't be Star Trek. No Kirk or Spock. Wait a moment. . . I have it! This must be Adventure International's new Tandy colour version of the classic adventure Strange Odyssey. Max, what have you done?

Strange Odyssey, of all the original Scott Adams Adventure Series, had the clearest outline, the most logical solutions, and the most innovative storyline. The premise was simple. Learn to operate the alien machine, take what you need from the places you are transported to and survive the ordeal. Originally written for the Tandy Model 1, Odyssey has been translated to a number of machines, most notably, the Tandy Colour Computer.

Except for the addition of graphics in the Atari version, no new ground has been broken in the CoCo version of Strange Odyssey. It is tightly wrapped as adventures go, careful of its pedigree and therefore faithful to the original. It was and is a pleasure to play. None of the brain-busting aspects of other adventures here. Just good old-fashioned clues and treasures, space-style.

Compatibility with the Dragon is a matter for the UK producer to deal with and something not confined at this time. But

the Adventure International organisation in Florida has never let off on the job so I expect there'll be a Dragon version forthcoming.

I know how to play this game. I think to myself, taking note of the memory that things get cold on this planetoid when the sun goes down. I work my way over to the cave which contains the alien transport machine. I figure to go somewhere warm until Max discovers what he's done.

But I rebounded without the phenomena of science, which transports a program together from one world to the next. I know the instant I materialised that I was not in the peaceful jungle dimension of Strange Odyssey.

Dastardly deeds

In fact, I realised it just in time to be very nearly fried by hostile laser fire from a hovering saucer. This guy was taking the entire area, shooting at everything that moved. I dove into a nearby crater and stopped moving. But I could see what was going on.

What I was seeing chilled me to the bone. I'd descended into one of the most dangerous programs on the American market. Outhouse (translation: outdoor water closet with no water). I froze where I lay as the Dastardly Little Toilet Raper Snatchers dodged while hot laser bolts in their quest to accumulate yet more paper. Oh yes, I know this game well.

Outhouse from Computer Shack (soon to change its name due to pressure from Tandy who do not like the word "Shack") to appear on anything is the (last) is an inopportune program that grows on you, after a while. The player assumes the role of Outhouse Protector General and takes the high ground with a gunnery position in the Flying Saucer. He has from, rear, upward and downward laser control which allows him to command the destruction of unauthorised flying things. His primary mission, though, is Guardian of the Watercloset.

It seems that there is a paper shortage. And the DLTFSs are everywhere, just waiting for a chance to steal in and make off with the precious paper. The advice in this batch (satellite game) is to use. There are laser bolts flying every which way as the Papercatcher Third Air Engagement Squadron tries to blast the player's saucer from the sky. But ever faithful to his duty the Outhouse Protector General carries on.

Also, in the heat of battle a stray laser bolt hits the Outhouse, which in turn vaporises indignantly at having been scorched (disintegrated). The OPG loses points, then a new round begins.

At about this point the reader must think I'm having him on. But not it's absolutely true! This game sells in the mid \$20 range in the USA and will make its British debut as soon as someone with unmeasurable courage manages to bring it across the water.

Is Outhouse Dragon compatible? I let another store wait. I'm beginning to think that outside of Tom M's and a few others, the American producers may be unaware of the Dragon market, an injustice you could remedy quite easily by flooding them with British postcards.

Two been laying here for a quarter of an hour watching this battle for control of the water closet. I'm quite frankly perturbed at the thought of exploring the rest of a world where toilet paper is the main form of currency.

Then I feel the upstart team hit me. The scene before me dimmed and fuzzed out. Then the laboratory came into focus. I found myself listening to Max expounding all the reasons why the Dimensional Download System had malfunctioned.

I listened patiently. After all, with a friend like Max, one expects these little go-it-up-front time to time. If I only knew which one of these little boxes contained the DSS ROM chip. On the other hand, from the inside out is not such a bad trip to see these programs anyway. Is it? ■

cable software for the DRAGON 32



DRONE
A 3D SHOOTING AND ACTION GAME WHICH TAKES PLACE IN THE SKY.



CAVE FIGHTER
A 3D BATTLES GAME. COMPLETE WITH 3D SOUND, 3D MUSIC, 3D GRAPHICS & 3D SOUND.



TRACE RACE
TRANSPORTED TO THE "TRACE RACE" BY THE DRAGON 32. THE FIRST IN A SERIES OF 3D RACE GAMES. THE FIRST IN A SERIES OF 3D RACE GAMES. THE FIRST IN A SERIES OF 3D RACE GAMES.



DRAGONER
AN ACTION AND ADVENTURE GAME WHICH WILL TEST YOUR REFLEXES TO THE LIMIT.

STOP PRESS !!

Software Top 10

Chart reproduced from DRAGON USER March 1984.

Living Stone

A GREAT BRITISH FIRST

The first version of this complex strategy game available on any home video.

Compete against the Dragon and you will need all your powers of concentration to beat the computer, which is programmed to think for itself. Complete against more mortals in the two player version on side two.



GEOGRAPHY



LEARNING IS FUN WITH **education-by-cable**



PRO-FILE
THE TOTALLY PROFESSIONAL DATABASE. FOR SUPERIOR TO ANY OTHER DATABASE AVAILABLE. 100% MACHINE CODE. COMPLETE WITH INSTRUCTION MANUAL & BLANK CASSETTE FOR FILE RECORDS.

TROJAN LIGHT PEN
DISCOVER THE EXCITING WORLD OF CREATING YOUR OWN GRAPHICS ON SCREEN.



cable software

Please supply me with: ☐ DRONE ☐ CAVE FIGHTER
☐ TRACE RACE ☐ DRAGONER
☐ MAGNAT ☐ LIVING STONE
☐ GEOGRAPHY @ £8.75 each

☐ DRAGON RACING/INVASION DOUBLE PACK @ £9.99
☐ PRO-FILE @ £15.95 ☐ TROJAN LIGHT PEN @ £11.50

ALL PRICES INCLUDE POSTAGE PACKING AND VAT

Send Orders to: **P.S.L. MARKETING, FREEPOST, LUTON, BEDS LU2 7BN**
(No stamp required)

Name
Address
.....

A serious system

Keith and Stephen Brain review the Dragon's business applications and associated software

ALTHOUGH THE Dragon 32 started life in the traditional games-oriented home micro mould, Dragon Data/GEO McMichael has started to push upwards into the small business market with the Dragon 84 and its range of "professional" software. At the same time many users have tired of just tapping alerts and monitoring maps and have started to look for more productive ways of employing their computer.

The OS-9 operating system (together with Basic9 and the Syngraph word-processing package) was reviewed in last month's *Dragon User*, but in case you missed that issue we should perhaps point out that Dragon Data's very powerful products will only run on a Dragon 84 with DragonDex and OS-9. However, for those with less dynamic Dragon systems, or less exotic tastes, a number of independent suppliers are also offering products which will run on the standard 32 or 64. Most of these are available on cassette, a tape number can be obtained on DragonDex or Data disks, and one is available in cartridge form.

Unspecialised

Some of the software is rather specialised, and is clearly aimed only at the business user, but much of it is of value to the average home user. In this article we will be looking at a number of the relatively unspecialised offerings (from both Dragon Data and the independents) which are of potential interest to the majority of users.

A number of programs are designed to help you balance your home budget. **Home Finance** (Atascut) is a relatively simple cassette program which allows you to keep records of income and expenditure under 11 headings. This number seems rather small and as they are only identified

by the letters A to K you also need a good memory, which is rather self-defeating. We have reservations about whether simple record-keepers of this type are really better than pencil and paper.

Home Accounts (MST) was originally written for cassette but has also been modified for disk use. This gives you the option of making forward estimates of your budget, and will report on how closely you have kept to these. In addition it provides a bank account option within the same program. **Personal Bank Account** (Atascut) creates two types of data file. The current file stores up to 100 recent transactions (including standing orders), while the second file contains all previous transactions. Labels up to 10 characters long may be used to describe entries. Standing orders (24) and cross-checking of bank statements are also catered for. The entries can be sorted and transactions can be searched for by description and/or value.

Personal Banking System and **Bank Reconciliation Module** (Hilton) are a somewhat similar tandem pair of programs on two cassettes or one disk. The first program deals with cheques and standing order entries, allows you to search for items by date, amount, cheque number or description, will calculate totals by category and includes correction routines which allow you to amend figures retrospectively. The second program allows reconciliation between your bank statement and your personally computed account, and reports items outstanding. The comprehensive manual includes a description of the program and a nice touch is that Hilton promise comprehensive after-sales support.

The disk system has an interesting title page, although we trust that the gentleman shown is supposed to be "before" and not "after" using the system! We understand

that this program is currently being modified to run in conjunction with the Micro-robot Rainbow Writer Screen Enhancer, so that a 512x4 column screen is used.)

Databases are filing systems which can have all sorts of practical uses, ranging from storing records of your stamp collection or favourite recipes to storing literature references or stock records, and a good non-specific database program can be tailored to the needs of your particular application. Care must be taken to read the small print when comparing claims for different databases as the amount of memory available is more or less fixed, and this can only be divided up into individual parts which add up to the whole capacity.

Files and fields

A "file" is made up of "records" which are divided into individual "fields". Thus if only 10000 bytes are available for storage then these can be used as 100 records with 10 fields each containing 10 characters, or 10 records with 10 fields containing 100 characters, but never as 100 records with 11 fields containing 10 characters, as this exceeds the total memory. With a disk system it is possible to have much larger data files, but only if the program is written to exploit this fact, and many simple conversions of cassette programs do not take full advantage. Common features are the ability to add, change, delete, find, sort, save and print records, but the various programs differ in detail.

The **Filing System** (Progressive) is particularly well designed for the novice user. It is cassette based and progressive provides an excellent manual together with a tutorial on tape which uses both an example data file and a real speech track to introduce the system. Other companies would be well advised to offer such a comprehensive package. Two different database programs are provided in the package. The first is free format, so that, for example, it is not necessary to decide in advance the maximum size of records. This makes it very easy to use, but slows down sorting and searching.

The second version is fixed format so that it is faster. It allows multi functions to be used for calculations within and through records, and provision is made for conversion of records from version 1 to version 2 format if you change your mind. Progressive is confident enough to offer a



PERSONAL
BANKING
SYSTEM

HILTON COMPUTER SERVICES LTD.

A/C: ST GEORGE 1983 P. 2

DATE	DETAILS	DR/CR	BALANCE
3SEP	ORIC	+6.00	843.50
5SEP	SALES	90.00	941.50
17SEP	SINCLAIR	-19.62	921.88
26SEP	DRAGON	-10.00	911.88
31SEP	900550	-80.00	831.88
17OCT	SINCLAIR	-19.62	812.26
26OCT	DRAGON	-10.00	802.26
10NOV	900551	-12.26	790.00
16NOV	900552	-286.00	504.00
17NOV	SINCLAIR	-19.62	484.38

Figure 1: sample printout of Hilton's Banking System

customer "Hot-Line" for problems. Starting Microsoft has ventured on to the serious side again with the **FileMaker** data management system originated by Sam Ware (owner of dBase). This program has a number of unusual features. First of all there is a full-screen editor, which allows you to easily design a customized data input screen with up to 30 fields. Once this format has been completed, it can be saved, and then the program neatly and automatically deletes the screen editor routines to maximize the space available for data storage.

Machine code subroutines are used to provide fast sorting (although unfortunately in our version those seemed to clash with the ROM on the 64K) and relational operators are allowed in sort selection. As we have come to expect from a full conversion, what it does it does very well (and at least they have had the sense not to associate the name of Culbert with this one).

Informanager (J-Soft) is rather a hybrid as it includes a database, a calculator, and a taxcost plotter. Rather than using the traditional menu approach, where it's either numbers or letters to select screen options, this program uses "command" words. You may obviously have a personal preference for one system or the other but we must agree with the command in the excellent manual that menu selection often becomes tedious once you have learnt how to use a program. A "HELP" screen can be called up at any time if you cannot remember a particular command word. "STATUS" will give you a useful indication of the amount of memory already used, and "PRINT" contains options which allow you to easily include formatting commands. Records may be transferred to any of 12 individual system memories, where they may then be subjected to calculation, and plotted out as a bar chart. This program is inexpensive and provides a reasonable introduction to data management for the home user.

Limited system

MST offers **Database** on cassette and disk. This has the standard basic options, but the record sizes are limited, and the ease of use and capabilities of this program seem to fall rather short of the other systems described so far, and it has little to recommend it. A version supporting the Compuserve hi-res cartridge is available, but of course this cannot be used with a disk system.

The final program considered in this section is the Dragon Data **RM5** (Record Management System) which runs under OS-9. This weighs in at a hefty (314.0K) but is really in a different class to the other systems, as it was originally written to run on much more expensive 6800 machines. Of major importance is the extreme flexibility of the system, and the ability to transfer files readily between RM5 and other OS-9 programs, such as Syntagraph, Dynadraw (see below) and Basecad.

We have criticized Dragon Data's new standard packaging for its simpler offerings, but we must admit that for those

serious products it fits the bill well, as the disk contains the disk and detailed manual, and the rear cover clearly indicates with icons and words the system requirements. A 640x34 column screen display is used, so that it is possible to show much more information on screen. The disk contains a suite of machine code utility modules. **RAMBASE** is used to create and format a new RM5 data file tailored to your exact specifications (which can be altered later). **RM5** is an editor which is used to input and modify data in files. **REPORT** is used to produce output of selected fields to any standard output path (screen, printer or disk file) in a totally customizable way. **INDEX** adds great power as it allows you to produce any number of indexes to the contents of your random access database, which can then be used to drive the editor and report programs.

State Finance 21.00 (K)	Alison Software 21 Union Street Farnborough Hants
Personal Bank Account 21.00 (K)	
Spreadsheet 21.00 (K)	
OS Series Home Accounts 21.00 (K) 214.00 (K)	MST Consultants Rector Road Bovey Tracey Devon EX20 3BB
OS Series Database 21.00 (K) 214.00 (K)	
OS Series RM5-Cat 21.00 (K) 214.00 (K)	
Personal Banking System 212.00 (K) 214.00 (K)	Witrol Computer Develop 18 Jersey Road Letchford Leeds MK20 6UB
Informanager 22.00 (K)	J-Soft Twicken Station Barnhampton W2 6LY
FileMaker 219.00 (K)	Microsoft 41 Third Floor St Austin Canwell PL26 5UR
The Filing System 230.00 (K)	Programmer Software Market Street Wrexham Wrexham
Dynadraw 224.00 (K) RM5 214.00 (K)	Dragon Data Barns International House Morgan Port Talbot West Glamorgan SA11 2PE
File Base 245.00 (K) 246.00 (K)	Microsoft 1 Balanced Road South Dulwich East

Finally **RMSCOPY** allows you to change file structure and merge separate files together. At first the system is rather bewildering as when setting up the first file it can be a little difficult to see the word for the trees, but once you have passed this hurdle manipulating the database is simple and it is easy to create well mapped structures, so that it is almost all the way. A series of useful sample files are included on the disk for you to experiment with.

To use the **REPORT** facility you need to create a **REPORT** (RM5C) file, for which a text editor is necessary. The best way to

do this is to use the Syntagraph word processor, but even the standard OS-9 system disk (which you need anyway) contains a simple text editor. This is a professional product of a very high standard and for any serious user it should soon pay its way.

Spreadsheets

A spreadsheet is made up from a matrix of individual "cells" which can normally contain text, values or formulas. The major use of spreadsheets is in "what-if" problems where you can examine the "ripple-on" effect of changes in any particular factor(s). **Spreadsheet** (Abitus) is a relatively simple, limited but inexpensive implementation which is more or less dedicated to cashflow projections. The instructions are rather sketchy and it seems of limited general value. **MST-Calc** (MST Consultants) is a disk-based program including a 18 page manual which explains quite clearly with examples the function and operation of the spreadsheet.

MST-Calc has a fixed format cell structure with 26 columns (each 13 characters long) and 255 rows. This gives a total of 422 cells, although only 99 of these can be on screen simultaneously. Mathematical operators can be used across columns and down rows. Cell contents can be formatted globally or individually as signed pounds and pence, signed integers, right justified, left justified, or as a bar chart plot. A row or column can be inserted or deleted, a window of the spreadsheet protected against alteration and calculation may be automatic or manual. Information can be stored on disk as one of five disk files, the disk directory can be inspected, and a hard copy of the spreadsheet produced with the print option.

Replicate is a useful feature which allows you to copy a particular formula into consecutive cells with automatic adjustment to the co-ordinates of other cells referenced. **MST-Calc** is more sophisticated than the offering from Abitus, but, as it is written in Basic, it is rather slow and the manual warns that "you must be patient when large numbers of calculations are being performed".

Wile-Calc is a very elegant full-feature 185 machine code spreadsheet program supplied for the Dragon by Microsoft, who is offering it on cartridge or disk. It provides a grid with 255 rows and 255 columns and the width of any particular column can be set individually to values between 1 and 25 to produce a customised structure. Individual cells, ranges of cells and whole blocks of the matrix can be referenced, and they can be blanked, copied, replicated or moved.

In add cell mode a fixed type line editor is provided which allows you to easily modify the contents of a particular location, and new rows or columns can be inserted. Cells may contain numbers, text or formulae and in addition to the usual maths operators and trig functions a number of non-standard functions are provided (average, count, lookup, max, min and sum), and **IF**, **THEN**, **ELSE** is supported. Constant mode allows you to predetermine

L	1:1		
T	"SAMPLE PRICE LIST IN ORDER BY PRODUCT DESCRIPTION"89;		
T	"DESCRIPTION OF PRODUCT	PART NUMBER	RETAIL PRICE"91
T	-----	-----	-----
P	DESCR1 PARTNO835 PRICE852 :		"81
X	DESCRIP:		

Figure 2: sample printout listing of Dragon Data's Record Management System report file

425 constants which may be numbers, expressions or functions. No less than 15 different cell formats can be specified.

The default for numbers is decimal with two digits to the right and the integer portion to the left, but this can be altered to give a fixed number of decimal places, integers only, comma insertion (eg 1,000,000.00), left justification, right justification, scientific notation, graphics display (barchart), automatic + and - display, and leading dollar sign. Text may be left or right justified and alternate printer fonts can be called. Ranges of data may be sorted into ascending or descending order, a text lock can be enabled, and "Y" will produce a disk directory. Data is normally written to tape or disk as a machine code file, but, an ASCII dump is also possible, which is compatible with many other programs, such as word-processors, allowing you to transfer data between utilities.

Hide/unhide are a valuable combination of commands which allow you to remove particular columns or rows from the display without actually deleting them from the matrix (just if you save a file with hidden

data). These can be used to produce a scrolling display with static labels, or to store "sensitive" information, such as list prices on a price list. Full control of format for printer output is provided. The pre-production cassette version we tested used the standard Dragon low-res screen but we understand that the final version will feature a high-res screen driver giving a 31 by 24 display which will further enhance the value of this very impressive program.

Dragon Data is offering the well-established OS-9 spreadsheet **Dynacalc** for £98.95. Once again this program has been thoroughly tested on more sophisticated systems and is most impressive. In many ways its capabilities are comparable to those of Etc-calc as most of the features are duplicated. However, one of the main advantages of Dynacalc over the latter is the presence of the "IS" (system) command which gives you access to the OS-9 operating system so that HD redirection and passing data between programs is simple.

Another very useful feature is the ability

to create "windows" where the screen (31"24) is split horizontally or vertically into equal or unequal sections which can be formatted separately and scrolled together or independently, and horizontal or vertical "tiles" can be enabled. Dynacalc can be used as well as radicans and "extra" functions are ACOS, ASIN, LOG (as well as LN), PI, ROUND, NPI (next present value), STDEV, CHOCOS, INDEX and ERROR. Etc-calc scores on FOX, SOX, RND and F-THRM-GL388 structures.

The range of cassettes (and of course prices) of the programs reviewed here is wider than usual so you must remember to carefully consider your present and future needs. If your actual or potential needs are extensive and you will benefit from a whole suite of software then clearly you should opt for OS-9 and hence Dragon Data's products (although of course you must also have the necessary hardware). On the other hand if your requirements are less taxing for your pocket it is less clear that there are a number of good programs available for even a relatively humble cassette-based Dragon 32. ■

DRAGON 32/64 SOFTWARE

The highly-acclaimed PERSONAL BANKING SYSTEM includes the following features —

- *Permanent records of your Bank Account
- *Single or sequential pages of entries
- *Automatic posting of standing orders
- *Full search facility with on-screen correction of any item.
- *Full instructions and demonstration file included
- *Additional Bank Reconciliation module included to match your PIBS items automatically with your Bank Statement
- *PLUS after-sale maintenance

PRICE: £12.00 (Cassette and Manual)

£15.00 enhanced (DRAGON DISC version (but excluding Bank Reconciliation module at present)

UTILITIES 1 — three interactive programs in one —

- *CASSETTE CATALOGUE
- *COMPRESS (removes all FREE and spaces from BASIC programs)
- *COPY (makes back-up copies of most BASIC and M6 programs)
- PRICE: £5.00 (Cassette)
- DEASSEMBLER — all in machine code — Finds in either Screen or Printer in Hex and Mnemonics
- PRICE: £5.00 (Cassette)
- 32 MEMORY MAP —
- Over nine A4 pages of memory locations in the DRAGON system.

PRICE: £5.00 (Booklet)



**HUTON
COMPUTER
SERVICES**

Huton Computer Services Ltd
Unit 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

At the end of the 1980s in the most comprehensive

PARADUS SOFTWARE LTD LIMITED

2, NEW STREET, RAMINGTON, NORTON, LANC.



MATHS TUTOR

A SET OF
PROGRAMS FOR
TEACHING
MATHS
TO CHILDREN
IN THE HOME

£5.00

EDUCATION

1. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 2. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 3. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.

4. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 5. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 6. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.

7. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 8. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 9. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.

10. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 11. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 12. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.

13. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 14. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 15. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.

16. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 17. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 18. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.

19. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 20. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 21. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.

22. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 23. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 24. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.

25. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 26. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME. 27. A SET OF 10 PROGRAMS FOR TEACHING MATHS TO CHILDREN IN THE HOME.



MUSIC TUTOR

A SET OF
PROGRAMS FOR
TEACHING
MUSIC
TO CHILDREN
IN THE HOME

£9.95

BUSINESS

1. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 2. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 3. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

4. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 5. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 6. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

7. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 8. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 9. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

10. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 11. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 12. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

13. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 14. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 15. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

16. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 17. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 18. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

19. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 20. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 21. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

22. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 23. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 24. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

25. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 26. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 27. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

AMES

1. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 2. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 3. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

4. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 5. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 6. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

7. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 8. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME. 9. A SET OF 10 PROGRAMS FOR TEACHING MUSIC TO CHILDREN IN THE HOME.

©1989 PARADUS SOFTWARE LTD

Dragon finds a new lair

Graham Cunningham journeyed to Berkshire to meet Ron Bosanks of GEC McMichael, now marketing Dragon Data's products, and talks about future Dragon developments

AN ELIZABETHAN estate in rural Berkshire is an unlikely place to find a satellite dish. However, there it sits, looking a little forlorn, beside the panelled walls that dominate the reception hall. But what's this got to do with the Dragon? Well, walk past the satellite dish and up the crenellated stairs to the loft. Open one of the heavy wooden doors and you'll find ... peripherals for your Dragon, courtesy of GEC McMichael.

Simon Peck, the GEC subsidiary's home, has seen darts, barons and knights come and go — and now it's seen the Dragon arrive. GEC McMichael itself has as interesting a line of descent as the Park. The McMichael branch of the family came into existence in 1699, providing equipment for wireless experimenters. It expanded into producing television receivers, and then out again when it merged with GEC in 1981. The television end of the market was left in the hands of GEC Radio and Television while McMichael concentrated on defence electronics. Two years ago the two got together and became GEC McMichael. And earlier this year that company took over UK sales and marketing of the Dragon.

This gives GEC McMichael more than 80 years' experience in communications, including cable television and satellite broadcasting. "For example," the company said, "when it was formed, McMichael is playing a major role in the United programme to provide the UK's first privately funded satellite for the direct broadcasting of radio and television programmes."

And this puts the Dragon alongside a range of other interesting products. Radios, televisions, intelligent telephones, video recorders, videodisks, teletext and video-

disc players — you name it in terms of home electronics and GEC McMichael's got it.

Dragon Data's enthusiasm for the marketing deal is hardly surprising. As managing director Brian Moore commented, it gives "the prospect of integrating Dragon Data's range with the well established consumer electronic products marketed by GEC". The enthusiasm is mutual. Ron Bosanks, the GEC subsidiary's chairman, regards the micro's arrival as strengthening "our position in the fast growing home electronics marketplace". Moreover, the deal leaves Dragon Data free to concentrate on "innovative product development".

Where next?

The possibilities for the Dragon within this range of supporting equipment are certainly promising. And Ron finds his enthusiasm hard to contain, talking of the pivotal role microes can play between telephones at one end and the television at the other. But he refuses to be drawn on this for the moment, promising only that ideas being discussed now should yield some interesting results by the end of the year — "moving things a little bit beyond the field of home computing".

On a more prosaic level, some of the results are already coming in. First of all there's the aforementioned peripherals: two printers and a cassette deck for if you prefer, data recorder), designed in colours to match the 64 but equally compatible with the 32. These will be going out under the GEC McMichael name as they are also compatible with other models. Target prices are about £26 for the cassette deck and £120 for each printer (one's a four-column printer/printer, the other's a thermal model). And

you should be able to buy them in the shops this summer — if not earlier.

Dragon Data is also strengthening its software catalogue, which already includes more than 80 32/64 files on cassette or cartridge. Already available is Super Writer II for word processing, some animated adventures are on the way, and there is to be an increasing emphasis on Education.

The plans for peripherals and software show that the 32 is not being forgotten amongst the more exciting possibilities of satellites and suchlike. As Brian Moore said earlier this year, the "new products coming on stream" are aimed to strengthen our position in the home computer market as well as moving us into the accelerated growth area of professional and small business usage.

You may have waited a long time for a solution to the problems of saving and loading, but at last help is at hand in the shape of the dedicated recorder. New users should be more lucky for they will have a chance to buy a Dragon starter pack consisting of a Dragon 32, cassette deck and selected software. Pricing has not been decided yet for this attack on V.C. territory, but Ron promises that it will be "highly competitive".

Little is being said at the moment about new microes, except that they will be comparable to the 64 and running the G59 operating system (among others, if earlier reports are accurate). But already available is the Dragon Business System — that is the 64, 64-bit-based applications software, a 16 or monitor and another (digger) printer. The system is being marketed as "your passport to professional software".

As we pointed out last month the G59 applications

software is impressive, and cheap. The range includes various book-keeping packages in addition to database management, spreadsheets and word processing (including Spelthrift and Mailmerge). And if you want to write your own "professional" software, try your hand with Basic OS, Pascal or a C Compiler.

Easy to use

Ron is willing to discuss the technical merits of G59, whose main rival for 68000-based machines is the Pave operating system, but he prefers to emphasise its ease of use. As the promotional brochure points out, "The G59 family of advanced software is not only more powerful than most other microcomputer software, it is also much easier to understand and to use."

The brochure also points to



Ron Bosanks - Keeping focused is a long task



Image future marketing the Dragon

another attribute of GEC, its portability. "Software and data can be taken to another computer using the same operating system." As Ron adds, he hopes that the other computer will be one of the new models Dragon Data is developing.

But even if the prices and the packages are right, it's the marketing that can make or break a product. This is where GEC McMichael comes in (in fact the business system brochure is headed "GEC-Dragon"). Ron has no intention of replicating the multiple outlets such as Boots, which have been responsible for most of the Dragon 32's UK sales. But he intends to promote the business system through other large chains, such as Flinders, which have specific electronics experience, and through independent dealers which he regards as the "primary market".

Boots itself said earlier this year that it did not expect to be stocking any business-only micros.

Ron is confident that "if we sell it through the right outlets" the business system will be a success. He regards "good High Street electrical and radio independent dealers as ideal". They "made the change from radio to television and now they'll make the change to include micro-computer systems". Importantly, Ron argues that such dealers will be able to give users support, advice and "hand-holding" — doing away with the need for a consultant.

The 64

Interestingly these plans make the Dragon 64 on its own appear like a product without a market. As we've said before if you just want to play games and learn about

Basic programming, there's little sense in upgrading to the 64. That machine only comes into its own when you add disk drives and the GDS software. Perhaps it was the success of the Commodore 64 which prompted Dragon Data to release its 64 ahead of GDS — it's amazing the power of (often misleading) numbers.

But the operating system and the application software have arrived as Dragon Data is keen to emphasise: "They're in the shops now." Immediate availability is important (unless you've got a hard-to-understand desire to lose Sinclair's pocket) because the market is so competitive. Not only is there the challenge of rival Dragon operating systems, such as Flex, there's also the challenge of similar systems running on rival micros. For example, Aztec is expected to release a second processor enabling the BBC B to run the Zetas operating system. Amix is similar to Unix, as is GDS itself. There are rumours that Commodore too is thinking about Unix-like systems.

The independent dealers which are the business system's hope for success will be stocking the package alongside other GEC McMichael products — those television sets, videos and intelligent telephones. Teletext and videodata adapters are also on their way, raising those visions of the future again, including satellite-receiving equipment under development which Ron promises will be of a "unique design".

Ron regards cable tv and satellites as being "co-partners". A lot of the country is unlikely ever to be cabled but satellites could provide "100 per cent coverage" — "something we've never been able to do before". But what are the chances of this coming about? Ron argues that if the political decisions are made in time, say before 1987, "the proliferation past that date will affect satellite's chances".

Ron is not sure that the social implications of satellites and cable tv "are that sinister". As he explains "the infrastructure is there now with interactive telephones" and could take "a lot of the chore out of life" while still leaving opportunities for social contact.

The teletext and videodata adapters stem from GEC

McMichael's acquisition last year of a company called Ayr Videodata. Such acquisitions, and the fact that Brian Moore himself is a GEC man on secondment to Dragon Data, raises the interesting question of GEC's overall communications strategy. Ron points out that GEC McMichael is "a separate product company operating under the overall umbrella of GEC". Under the same umbrella are GEC Computers, specialising in mainframes; another subsidiary covering business applications (Ron's emphasis is on consumer electronics); and Satellite Control Systems, where Brian Moore was deputy managing director.

Strategy

Brian arrived at Dragon Data last year following the departure of Tony Clarke. GEC had been approached for a replacement by Dragon Data's shareholders — one of which is Prutech, the technology investment arm of Prudential Assurance, itself an investor in GEC. Working out who's prompting who in this chain of events is difficult. In fact as an independent subsidiary GEC McMichael is unlikely to be informed of GEC's overall strategy, it would have to guess it from the financial targets it is set. And when Brian Moore was asked how long he would be at Dragon Data, and where he would go next, he shrugged his shoulders and said that only GEC itself could give the answer. Neither Ron nor Brian seems concerned about this — presumably it's a small price to pay in terms of the operating independence gained.

In fact it was GEC McMichael that made the initial approach to Dragon Data — and Ron had only met Brian once before. The first approach was prompted by Ron's interest in developing a micro for a component television. From there the talks snowballed so that the two firms are to a certain extent intertwined now. As Ron says: "Dragon Data is unlikely to develop products which we wouldn't be interested in marketing." So if you ask the question "What do you get if you add two GEC men together?" the answer comes back "Dragon peripherals, Dragon micros and Dragon software — and the promise of a whole lot more". ■

Features include

- 255 MAXIMUM NO. OF ROWS
- 255 MAXIMUM NO. OF COLUMNS
- VERY EASY TO USE
- INDIVIDUAL CELL FORMULAE
- COPY BLOCKS OF CELLS
- COMPATIBLE WITH ALL PRINTERS
- EASY 132 COLUMN PAGE WIDTH
- GRAPH FORMAT FOR BAR CHARTS
- COMPREHENSIVE MANUAL INCLUDED
- INTERNATIONAL USER GROUP
- SORT ROUTINE IN ASCENDING OR DESCENDING ORDER

- Single character commands
- Help display
- Enter text or formulae in 255 characters long
- Repeat text entries
- Available memory always displayed
- Rapid entry modes for text and data
- Selectable automatic cursor movement
- Insert, Delete, Move entries on columns
- Replicate one cell into row or columns with selectable quantity
- All machine language for bitstream speed
- 128K data storage space available in 32K systems
- Basic style formulae
- Arithmetic operators +, -, x, /, %, =
- Relational operators =, <, >, <=, >=, <>, <=, >=
- Logical operators AND, OR, NOT
- Conditional formulae IF... THEN... ELSE
- Trig functions SIN, COS, TAN, ATN
- Log Functions LOG, EXP, LOG
- Misc functions INT, FIX, ABS, SQRT
- Range functions SUM, AVERAGE, COUNT, MIN, MAX, LOOKUP
- Hex octal conversion
- User definable constant table
- User definable printer set-up commands
- Individual column width settings (1 to 255)
- Adjustable row height to insert blank lines without wasting memory
- Hide column rows
- Alternate grid line overlay call by cell
- Display/Print format set by cell row or column
- Column, column grouping, prefix or postfix signs
- Scientific notation, fixed point and integer formats
- Left or Right cell contents justification
- Full page formatting
- Formulas stored with worksheet on disc/tape
- Spreadsheet disc/tape files in compact memory form
- Scan disc operations
- Output ASCII file for wordprocessing input compatibility
- Memory resident mode... no repeated disc calls

ELITE *

CALC

NOW... The worksheet calculator program you've been waiting for is waiting to work for you. ELITE*CALC is a powerful, full featured spreadsheet for the Dragon 32/64 and Tandy Color Computer. Answer 'what if...' questions, prepare reports and cash flow projections, maintain records and perform other tasks which, until now, required sophisticated business computers. ELITE*CALC is a serious tool for those who want to do more than play games on their micro.

Available from stock on cartridge for the Dragon 32 or 64 or Tandy Color Computer... please specify. Shortly available on disc for the Dragon Data or CuriousPiemer or Radio Shack systems. Also available in the £-format instead of the £-format if requested.

THE BEST FOR ONLY

£45

Elite*Calc has had excellent reviews in the American press and an enthusiastic reception at the recent International Rainbowfest.

*"Elite*Calc is a great spreadsheet program"*

Stuart Hawkinson, Rainbow

"Truly one of the best programs I have seen"

John Steiner, Micro

"Very powerful program... essential to every serious user"

Mike Jarvis, M & J Software

ENQUIRIES INVITED FROM RETAILERS AND
DISTRIBUTORS (HOME AND OVERSEAS)

MICROCARE
1 OAKWOOD ROAD,
ROOE HEATH,
STOKE-ON-TRENT
☎ (03363) 5695

DRAGON 32/64

TANDY COLOR COMPUTER

Creating the very latest in graphic art

Paul Gale explains how to program your computer to create your very own modern graphic art.

THE IDEA FOR this program came to me one evening at home, while I was half-watching a television programme on modern artists. The other half of my brain was engaged in idly perusing the graphics commands in the Dragon instruction manual.

The television programme started to tell the story of how a certain artist's work was inspired by computer graphics. (On hearing these magic words my ears pricked up and my brain engaged) with the TV. It disengaged only seconds later, when I saw the artist's efforts — my Dragon could do better, I thought!

Programming

Later, I started to consider the idea seriously. How could I program my Dragon to paint "modern art"? At first, I considered the idea of pre-programming certain shapes, PUTTING them into arrays, and subsequently GETTING them. But I decided that this would be too complicated. What's more, I thought it would be much more fun to let the Dragon make up its own pictures without any help from me!

The program is constructed around the Dragon's RND facility — the first random number "1". I determined the usual PMODE to be used; I decided not to use PMODE4, both for programming simplicity and also because black and white or black and green pictures are quite boring. From line 150 onwards, the way the program runs is dependent on combinations of random numbers.

However, because the Dragon will always compute the same "random" numbers when it is first switched on, it is best to RUN and BREAK the program a couple of times before allowing it to run on unattended.

In the program, lines 278-290 draw a circle and point (1), the co-ordinates of the circle's centre having been determined in lines 179-248. The PAINT colour is determined by the value of "A" (line 285). As this value is between 1 and 4 you are probably thinking that this will not work for the SCREEN1, 1 colour set. I must admit,

```
99 *****RANDOM COMPUTER ART BY PAUL GALE*****
100 D=RND(1000)
110 F=RND(100)
120 IF D<=500 THEN 140
130 PMODE3,1:SCREEN1,0:PCLS:00T0150
140 PMODE3,1:SCREEN1,1:PCLS
150 IF F<=10 THEN 350
160 IF F>10 AND F<20 THEN 340
170 X=RND(100)
180 Y=RND(100)
190 Z=RND(150)
200 B=RND(150)
210 X=(X+Z)
220 Y=(Y+B)
230 IF X<=255 THEN 170
240 IF Y<=150 THEN 310
250 J=RND(40)
260 W=RND(50)
270 CIRCLE(X,Y),J,B,(W/10)
280 A=RND(4)
290 PAINT(X,Y),A,B
300 GOTO190
310 FORI=1TO3500:NEXTI
320 X=0:Y=0
330 F=RND(100)
340 IF F<=50 THEN 100
350 X=RND(255)
360 Z=RND(150)
370 CX=X+Z)
380 A=RND(4)
390 T=RND(150)
400 Y=Y+Z)
410 W=RND(150)
420 U=RND(150)
```

I thought so too, until I tried it. I was then overjoyed to discover that, in this mode, the numbers 1 to 4 can be used to represent the available colour sets on both SCREEN1's and SCREEN1's. Needless to say, this discovery helped simplify the program enormously.

Line 400 draws an arc at a position determined in lines 350-400. The start

point (5) and end point (6) of the arc are determined at lines 400 and 440.

Line 500 re-paints the background, while lines 650 to 670 draw a line, a rectangle or a rectangle filled in with the current foreground colour.

At various points throughout the program there are lines included which give the Dragon the opportunity of referring to


```

430 IF U<20 THEN S=.25
440 IF U>20 AND U<40 THEN S=.5
450 S=(S+.25)
460 IF X>250 THEN 330
470 IF Y>150 THEN 510
480 CIRCLE(X,Y),(R),CA,1,(S),1E)
490 X=X+Y*0
500 GOTO330
510 IF R<20 THEN 540
520 IF A=0 THEN A=1
530 PRINT(X,Y),(A=1),CA)
540 FORI=1TO300:NEXTI
550 R=RND(100)
560 IF R<50 THEN 170
570 IF R>50 AND R<90 THEN 590
580 GOTO300
590 C=RND(100):T=RND(100)
600 IF (0)=(Y) THEN 570
610 R=RND(250):X=RND(1250)
620 IF (0)=(X) THEN 610
630 IF (0)<0 THEN 630
640 IF (0)<0 AND (0)<25 THEN 640:EL:560
650 LINE(H,0)-(X,Y),PSET:GOTO660
660 LINE(H,0)-(X,Y),PSET,E:GOTO660
670 LINE(H,0)-(X,Y),PSET,IF
680 FORI=1TO300:NEXTI
690 IF R<42 THEN 590
700 IF R>42 AND R<125 THEN 170
710 IF R>125 AND R<300 THEN 330
720 GOTO300

```

- If the start or running through the same routine again. Thus you may get a screen filled with circles, stars or rectangles — or nothing at all.

Abstract

When I first ran the program, my wife commented that it would be even better with some sort of musical accompaniment. I thought about this, and realized that it could be easily achieved by use of the AUDIO and MOTOR commands. Thus, if you want to add music to your program, simply include an extra line as follows:

185. MOTION OVERAUDIO ON
Then, when you have loaded the program, insert a tape of music of your choice into your cassette recorder and depress the **PLAY** button.

When the program runs, your Dragon will automatically turn your cassette player on, thus providing a unique soundtrack for its own artistic efforts (but don't forget to enter MOTION OFF and AUDIO OFF when you ENJOY the program).

I have run this program for decades at my friends and they have all very quickly become fascinated by the patterns and "pictures" shown by the Dragon, Fibonacci, etc. Many of them are convinced that the patterns are somehow synchronized with the music! As to whether or not it's an art, I'll leave to the critics. However, I can confirm that it's a lot of parties — as long as you don't mind spending an evening trying to tease your guests' eyes away from the television set.

**LOOK! ITS HERE AT LAST... THE ONE YOU'VE WAITED FOR...
THE INCREDIBLE**

LOGO-ART

[illegible]

NO JOYSTICKS NEEDED!!
JUST LOOK AT THESE FEATURES:

THE FUTURE

1. The first step is to identify the problem. This involves understanding the current situation and the goals that need to be achieved.

© 2000 The McGraw-Hill Companies. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without prior written permission from The McGraw-Hill Companies, Inc.

© 2000 Blackwell Science Ltd *Journal of Internal Medicine* 247: 351–357

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 103–110

66-95

Abstract

McGraw-Hill

CHERRY HOUSE ESTATE.

NEWCASTLE UPON TYNE,
NES 142

A pie chart showing the distribution of 1000 people by age group. The chart is divided into six segments labeled A through F. Segment A is the smallest, followed by B, C, D, E, and F is the largest.

$$\begin{array}{cccccccc}
 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8
 \end{array}$$

LINKS-OUT (EXP-OUT) (EXP-OUT) %
 NO. RETN (EXP-OUT) (EXP-OUT) %
 (EXP-OUT) (EXP-OUT) (EXP-OUT) (EXP-OUT) %
 (EXP-OUT) (EXP-OUT) (EXP-OUT) (EXP-OUT) %



HERBY DEVLIN
PRESENTS.....

LEAD-ART
FOR THE
COMICS OF

THE COMICS TO COMICS SYSTEM

The diagram illustrates a complex floor plan of a building, likely a school or office. It features multiple levels connected by stairs. Key areas include:

- Top Level:** Labeled "BIBLIOTHEQUE" (Library) at the top left and "SALLE DE RECEPTION" (Reception Room) at the top right.
- Middle Levels:** Contain numerous smaller rooms, many labeled "CABINET" (Cabinet/Office), arranged in rows.
- Bottom Level:** Features larger open spaces, possibly auditoriums or lecture halls, and several large rectangular structures that could be storage units or specialized equipment.
- Corridors and Stairs:** A network of lines connects different parts of the building, indicating movement paths between floors and sections.

HOBBY SOFTWARE,
8, ELGAR AVENUE,
CHAPEL HOUSE ESTATE,
NEWCASTLE UPON TYNE,
NE5 1JZ

[illegible]

What's your best source of information on color computing?



Now you can improve your color computing skills... and it's easy to do. **HOT CoCo** gives you more practical information on the Dragon* than any other publication. Nearly 150 pages a month!

Every issue is packed with exciting new things for you to do. We won't waste your time with filler stories. You'll get *interactive* columns:

- **Klone's Arcade**—enjoy old-fashioned arcade style games on your computer
- **The Basic Beat**—learn everything you need to program in Basic
- **The Educated Guest**—discover how to use your computer as a teaching tool
- **Dosize ASCII**—get answers to your technical questions
- **Graphically Speaking**—create eye-catching designs that add appeal to your programs

You also get a dozen easy-to-understand articles every month. Games... utilities... programming techniques... tutorials... graphics... education... hardware projects. They'll help you expand what you can do. And complete program listings show you how to use what you learn.

That's not all. **HOT CoCo** saves you money too:

- **Candid reviews** help you make every purchase a sound investment.
- **Informative ads** let you comparison-shop from home.
- **New-product announcements** tell you what's available before it reaches the stores.

With all this at your fingertips, your subscription could pay for itself with one wise purchase.

And **HOT CoCo** is risk-free. If you don't like your first issue, just write "cancel" across the invoice and return it to us. You won't owe a thing.

Subscribe to **HOT CoCo** today. Twelve big issues are only \$44.97 (US funds drawn on a US bank). Simply fill out the coupon below and return it right now to: **HOT CoCo Subscription Dept., PO Box 975, Farmingdale, NY 11735, USA.**



95%

* Dragon is a registered trademark of Dragon-Box Ltd.

YES! Help me improve my computing skills. Send me 12 issues of **HOT CoCo** for \$44.97 (US). I understand that with payment enclosed or credit card order I will receive a **FREE** issue, making a total of 13 issues for \$44.97 (US).

Get a 13th issue **FREE** when you enclose payment or charge it on your Mastercard, Visa, or American Express.

☐ CHECK/MO ☐ MC ☐ VISA ☐ AE

CARD # _____ EXP. DATE _____

SIGNATURE _____

NAME _____

ADDRESS _____

POST CODE _____ COUNTRY _____

HOT CoCo • 90 Pine Street • Portsmouth, NH 03801 • USA

330PDU

SHARDS proudly introduce for the Dragon 32

"The Mystery of the Java Star"

THIS IS AN EDUCATIONAL ADVENTURE OF EPIC PROPORTIONS

Taking up over 100K of memory, including 80K of high resolution graphics, and loading in four parts, this adventure is designed to provide hours of family fun, filled with puzzles, challenges and interesting facts. Also, with three levels of difficulty and a score sheet at the end, this is a game you can play again and again, to try and beat your last score.

You have discovered an old map and a ship's log book, indicating the existence of magnificent treasures, including a mysterious ruby, the Java Star, aboard an 18th-century sailing ship, that sank in the Caribbean. You must mount an expedition, gathering all the necessary information, then search for the shipwreck and the hidden treasure. Many skills are needed to solve this mystery, making it the ideal adventure for friends or family to play together.

ALL THIS
FOR ONLY
£7.95

AVAILABLE NOW AT ALL GOOD STOCKISTS OR BY PHON-
ING THROUGH YOUR ACCESSCARD/CARD ORDER TO
01-514 4871 OR BY SENDING A CHEQUE/PO FOR £7.95 TO
SHARDS SOFTWARE, 189 ETON ROAD, ILFORD, ESSEX IG11
2UG



THE STATACOM TOP 10

- | | |
|-----------------------|-------------------------|
| 1. Drums | 6. Devil Assault |
| 2. Laser Power Pong | 7. Danger Range |
| 3. 4 Ball | 8. Astrocrisis |
| 4. Jango Revenge | 9. Outlaw in the Jungle |
| 5. Outlaw in the Mine | 10. Super Shuttle |

Also: GAMMAVISION, H-RIS, SORT +, COMPOSER, ETC.
We stock over 300 titles for the Dragon Games, Educational,
Utility and Business software. Try before you buy.

MONITORS

MOVIE 14" Colour Monitor £250.00
FOU 16" and 18" composite video and sound
BARTO 15" Green Screen £87.00
PROBEA 12" Green Screen £99.00
PROBEA 12" Audio Scope £59.00

DISC DRIVES

SHARPE Drive + Controller £175.00 single, £225.00 twin
CUMANA Drive + Delta £259.00 single, £329.00 twin

PRINTERS

SEIKO EP 160 A £229.00
MICROLINE 80 £119.00
MICROLINE 80 £229.00
SEIKO EP 200 £229.00
SEIKO EP 200 £229.00
SEIKO EP 200 £229.00
SEIKO EP 200 £229.00



3" DRIVES

FOR DRAGON 32/64
FOR ONLY £330 incl VAT + P&P

Price includes EVERYTHING needed to operate the drive: i.e., Metal case, Power supply unit, Connecting cables and DELTA CONTROLLER

The drives use the latest technology e.g., a "wippable" diskette that is virtually indestructible.

Capacity 180K per side

DEALER ENQUIRIES WELCOME

Please contact

STATACOM DISTRIBUTION

Tel: 01-661 2266

STATACOM LIMITED

189 ETON ROAD
ILFORD, ESSEX IG11 2UG
01-514 4871

A question of luck



It's not logic that a physicist turns to when he's in doubt, it's luck. John Royds introduces the "Monte Carlo" technique and shows how to use it on your Dragon

HAVE YOU ever wondered how some of the more complicated problems in, say, physics are solved using a computer? A problem such as calculating the radiation levels in a nuclear reactor, for example, is not a simple one. The answer is that when the problem is as difficult as this then the physicist resorts to luck. In fact the technique is called Monte Carlo to underline the element of luck. However, the end result is no more lucky than is an insurance company making a profit. As far as a reactor is concerned, I'm sure you are glad of that.

There are at least two ways of using the Monte Carlo method. The first requires the programmer to have a good knowledge of probability theory to completely master the method. However, a simple example is shown below.

Suppose you wish to find out the probability of throwing two dice such that they total seven. Well, the answer is 0.16666. The way to calculate this using the Monte Carlo method is to make the random number generator your die. This is possible because the function RND (6) will give an integer between one and six with equal probability — just like a die. That you just "throw" this die twice and see what you get — then do it again and again. In fact, about 10,000 times would do. The probability is simply the number of times seven was obtained divided by 10,000. Hence the program in Figure 1.

The reason this method is used is because nearly any fool can do it since it is so easy. For example, it would be no

problem to modify the program to simulate throwing six dice and then obtaining the probability of some pretty obscure combinations. To do the calculations theoretically, however, gets progressively more difficult. The only problem is that the answer is never exact using the Monte Carlo method — but then neither is life.

The computer may give you answers to six figures but you are rarely interested in more than the first two — unless it's money, of course.

The other method of using luck in a program is to use it to choose trial solutions to a problem that you wish to solve on the basis that if you try enough, you

```
10 SUM=0
20 FOR I=1 TO 10000
30 N=RND(6)+RND(6)
40 IF N=7 THEN SUM=SUM+1
50 NEXT I
60 PRINT "PROBABILITY=";SUM/10000
```

Figure 1: make the random number generator your die

```
10 DIM ST(12,6),WC(10),FC(12),NR(12),P(12)
11 MT(12,20)
15 INPUT "4 P MEALS BEFORE MEETING SAME PERSON?" N
18 REM INITIALISE AND ARRANGE FIRST SITTING
19
20 FOR I=1 TO 12:ST(I,1)=1:FC(I)=2:NR(I)=2:IP(I)=2:NEXT I
21 J=1:GOSUB 8000
25 REM LOOP SITTINGS
48 FOR J=2 TO 6
50 FOR I=1 TO 12:WC(I)=1:NEXT I
55 REM CHOOSE FIRST GROUP'S FIRST COURSE
```

Continued on page 20

Figure 2: finding a solution


```

50 N=RND(12):(FCFN)=81THEN 52
55 ST(1,1)=N
70 O=1:FOR L=N TO 12:W(L)=W(L)+1:NEXT L
75 REM NOW LOOP THROUGH EVERYONE ELSE
80 FOR I=2 TO 12:T=8:K=1:-INT((1-1)/32)OIES
  =CJ-RE(12-1):(FEK)1THEN 82=1
85 REM CHOOSE FOR CURRENT COURSE
90 N=RND(12):N=INT(N):T=T+1
95 REM IF BLIND ALLEY START AGAIN
100 IF (T=8) THEN PR(NT"AGA"=801020
110 ON K GOTO 140, 170, 200
115 REM FIRST COURSE
140 IF (F(N)=8) THEN 50
150 GOTO 220
160 REM MAIN MEAL
170 IF (M(N)=8) THEN 80
172 MF=ST(1-1,1)
173 REM SET RECENTLY? IF SO CHOOSE AGAIN
174 FORCE=65 TO (J-1)82
176 IF (M(N,EE)=MF) THEN 80
178 NEXT EE
180 GOTO 220
185 REM PUDDING
200 IF (P(N)=8) THEN 80
202 NS=ST(1-1,1)
203 REM SET RECENTLY? IF SO CHOOSE AGAIN
204 FORCE=65 TO (J-1)82
206 IF (P(N,EE)=NS) THEN 80
208 IF (P(N,EE)=NS) THEN 80
210 NEXT EE
220 FOR L=N TO 0:W(L)=W(L)+1:NEXT L
230 O=O+1:ST(1,1)=N:NEXT I:GOSUB 1000
650 REM PRINT ARRANGEMENT FOR THIS SITTING
N0
900 FOR I=1 TO 12:PR(NT"ST,F,M,P":ST(1,1))
  F(1):M(1):P(1):NEXT I
910 NEXT J
920 GOSUB 1020 995 END
930 REM SUBROUTINE TO UPDATE WHO COOKED
  WHO? AND WHO SET WHO?
1000 FOR L=1 TO 12:STEP 3
1010 FC(ST(L,1))=FC(ST(L,1))+1
1020 MM(ST(L,1,1))=MM(ST(L,1,1))+1
1030 PC(ST(L,2,1))=PC(ST(L,2,1))+1
1040 NEXT L
1050 FOR L=1 TO 12:STEP 3
1060 A=ST(L,1):B=ST(L+1,1):C=ST(L+2,1)
1070 AT(A,J#2-1)=B:AT(A,J#2)=C
1080 BT(B,J#2-1)=A:BT(B,J#2)=C
1090 CT(C,J#2-1)=B:CT(C,J#2)=B
1100 NEXT L:RETURN
1120 REM SUCCESS! O=P RESULTS
1200 FOR L=1 TO 12:PR(NT L:FOR J=1 TO 8:PR(NT
  USING"##"INT(L,J#2-1)INT(L,J#2):NEXT J:P
  R(NT NEXT L 1210 RETURN

```

→ you may stumble on a solution which is good enough for your purposes. For this method to be of use there is no need to have any knowledge of probability and so anyone can do it. I will go through a program now that uses this method to solve the sort of problem that you are quite likely to encounter.

You are a member of a supper club. In this club, each couple has a meal with two other couples. Each couple cooks one of the three courses but they all eat at the home of the couple that supplies the main dish. The requirements to be satisfied when arranging the rota are that (1) every couple cooks the same number of starters, main meals, and puddings when taken over a long period and (2) the time between couples meeting again is as long as possible. Easy, you think. Well, try it by hand for 12 couples and six sittings. Although there are 20 million ways of choosing a single sitting, choosing just six that will satisfy the above requirements is not so easy.

A program that will find a solution (eventually) is shown in Figure 2. It is not a complicated program because it does not attempt to exhaustively go through all possible combinations for a sitting, it merely tries solutions at random. The conditions for an acceptable solution are that all couples cook two starters, two main courses, and two puddings and that couples do not meet at a meal again until all meals have passed. The program is for 12 couples and six sittings, though this can be easily changed.

The arrays are as follows:

F(N)	No. of first courses couple N has cooked
MM(N)	No. of main meals couple N has cooked
P(N)	No. of puddings couple N has cooked
W()	An array holding couples not yet allocated for current sitting
MTN(J,2)	Holds which couples couple N met on the Jth sitting
MTN(J,2-1)	

For group 1, for the Jth sitting:

ST(3)=(L-1)+1,J)	Holds who cooked first course
ST(3)=(L-1)+2,J)	Holds who cooked main meal
ST(3)=(L-1)+3,J)	Holds who cooked the pudding

The first sitting is done "by hand", so to speak, since there are no restrictions for that sitting. The program then arranges the rest by randomly choosing a couple for each particular course and group and checking that that couple satisfies all the requirements.

While it is possible that this program may be of use to some of you, its main purpose is to show a simple method that can be used to solve some quite complicated problems that are met in everyday life. Anyway, it makes a change from zapping stars with your Dragon. ■

SHAPER

- Library of 160 pre-defined modifiable sound effects included
 - Sound-building routine for you to create up to 100 effects
 - All sounds accessible from within BASIC or machine code
 - BASIC loader/event included to aid program development
 - Comprehensive manual included with full background and source files
- AND ALSO INCLUDING, AS EXTRAS
- Test-timer loader/event routine
 - User highlight routine to protect your programs
 - Free computer cassette to share your own effects

Shaper is a comprehensive sound utility program for the Dragon 32. It contains a library of 160 different machine code generated sound effects, which can be mixed, modified, or changed at will, then stored outside the BASIC, ready for use from within your own program. As well as enabling you to simulate the sound of any musical instrument, the sound-building facility of Shaper will help you create a variety of unusual and weird effects; flares, machine guns, explosions, voice sounds, tip-taps, drums, whistles, flying saucers, shell-shells, clankers, water drops and ring sounds are a few of the very ones. This package is designed both for the serious games programmer and the interested beginner. It has for anyone most of the limited 255/255 and 254/254 commands of the Dragon and also enables to create sounds limited only by their imagination.

Zap Pow Bong Whoosh
Crunch Screech Bang
Whack Zoom Thud
Wallop Crack Wham
Smash

SHARDS

Family Software Specialists

169 Essex Road, Hford, Essex IG1 2UQ. 01-514 4871

DO YOU TAKE YOUR DRAGON SERIOUSLY? MAKE YOUR DRAGON EARN ITS KEEP WITH ONE OF OUR APPLICATION PROGRAMS

JUNIPER BASIC WORD PROCESSOR

A more down 'n' out word processor than most. Includes auto scroll, auto character line, tabulation, auto print, auto/over print, etc. Print facilities include justify, no word break, up to 255 printed characters per line, multiple copies. Runs most games.

PRICE (SHARD) £12.95
DATA 845 COMPUTER
C0867761 DECISION £25.95

TELETYPE ADVANCED WORD PROCESSOR

A more advanced word processor with additional features such as forms display with true over data, blank mode, find and replace, etc. Microplot £45.95

JUTTERBOX

Plotting (print meter) at £15.00
Self-centering (double) at £15.95
NEW QUICKCOPY PHOTO, Copy JUTTERBOX NOW AVAILABLE ON DRAGON
Each £11.95 (switch self-centering)
DRAGON CASE COVER
WITH £550 £4.95

PERSONAL FINANCE MANAGER

A suite of three programs plus comprehensive user manual, designed to aid the management of your domestic or small business accounts. The PFM is an easy to use, menu driven double entry general ledger which includes:

- Item defined data template for optimum flexibility use
- Typically 100 accounts
- On screen or printed reports
- Unlimited transaction data
- Performance against budget

ONLY £15.95

NEW PROGRAMMER'S UTILITY

This new package includes a set of routines which can be incorporated in programs, and includes the following:

1. Save machine code in BASIC programs to auto-run, and display own screen when loading
 2. Enable/disable the break key
 3. Material with error key
 4. Real time clock accessible from BASIC
 5. Copy controller from BASIC
- ONLY £15.95
SHARD MONEY TITON £5.95

LANGUAGES: FULL FORTH £15.95 OMS BASIC COMPILER £14.95 OMS PASCAL COMPILER £14.95

PRINTERS: STAD (STAD) 800x8.5" wide paper, friction feed, thermal-dot matrix printer. Superb value at £149.95. Thermal paper £9.95 per 100' roll. SHIRAZA (CT) 800x8.5" wide paper, friction feed, thermal-dot matrix printer. Superb value at £149.95. Thermal paper £9.95 per 100' roll. Printer cables to connect any of above printers to your Dragon £2 £15.95. STAD/SHIRAZA 100x100 a bargain at £250.00

GALES: We can supply a comprehensive stock of games, including The King, Frogger, The Outland Range, Skunk, Crazy Painter, Danger Ranger, Gnomes, Gnomes, Dragon Hawk, Pictol, Knight Mail, Space Fighter, Space Masters, Air Traffic Control, Devil Assault, and intergalactic forces from Microbots (all at £7.95), plus games from Dragon Data, Cable Software, Packsoft, Salamander, Oasis, Quark Data and Signify Data.

PRICES: All our prices are inclusive of VAT and postage to UK mainland. To order, send cheque/PD or Access No. Or phone your Access No.

SPECIAL OFFER: 10% discount on 3+ purchases. Send for our FREE price list of Dragon/Chameleon/Spectrum/Orbis Hardware, Software, and Accessories.

We reserve the right to amend prices without notice.

JUNIPER COMPUTING

8 Pembroke Green, Lea, Malmesbury, Wiltz SN18 9PB. Tel: 06643-3669
SAVE ON PHONE BILLS AND CALL US CHEAP RATE BETWEEN 9 pm and 7 pm

Code with no fixed abode

Stuart Sampson follows the course of the nomadic code

THE DRAGON may have to lie, but the programs in his memory can be as nomadic as Bedouins, if you know how to write them that way. The relocatable programs, or, to be more precise, the position-independent programs, is a real bonus for the 6800 programmer. Of course other processors can manage short position-independent routines, but there is no length limit on the Dragon's processor.

What is the advantage of writing nomadic code? The answer comes easily to any basic programmer enhancing their latest masterpiece from the stock pile of machine code they have collected over the years. As they get them out and arrange them, working back from Memory Top, they may well find that they end up away from their location of origin. It would be good if they worked without alteration.

Machine-code programmers may also like nomadic coding for their utilities. How nice to be able to load a monitor into seven spaces to service a major epic without clashing with any of it. Dragon Data has thoughtfully provided commands to make this easy. The CLDRCM command can be given an offset to service the program's ender-list, and the Dragon DOS LOAD command accepts a specified address to load the program and corrects the exec address accordingly.

The simple routines published for speeding up scrolls and other graphics effects are almost all relocatable. As with other processors it is quite difficult to make routines of more than 100 bytes any other way, but push up the length and watch other computers fall by the wayside.

What makes a program good code? Answer — any absolute addressing involving locations within the program. The worst offender is forward Addressing with the JMP and JBR instructions. Jumps require you to specify the actual address of the destination, and of course, when you move the program this has to be changed.

The first step to position-independence is to use the branch instruction. Even the 6800 can manage this, provided it is sitting at a point not more than 128 bytes back or 129 bytes on from the address of the instruction itself. Odd people call this a relative jump. In little parlance it is a branch of the short or normal variety. However by using the 6800's long branch, anywhere within the 64K of addressable memory can be reached. One can sit about memory with the grace of a bird, and

for something else to sing about, you can branch to a subroutine, in either mode. Watch out for 200s with shrunken wings singing this song though!

For those who find branch displacements confusing and haven't got an assembler to take care of it here are some facts. If the displacement is zero or the branch does not happen, the program counter goes on to point to the next instruction, so it is relative to the address of the next instruction that the displacement is calculated. The displacement is added to the no-branch address by means of signed arithmetic. In the case of normal branches, a number exceeding 127 (01111111) has its top bit set and is deemed negative, so the branch goes back. It same mean person mentions "2's-complement", don't panic, just subtract 256 from any number above 127 to get its signed value. Conversely, to derive the displacement for a backwards branch, count back from the address of the next instruction to your destination to get a negative value, then add 256.



Long branches work on the same principle, except they need 2 bytes, that is, 16 bit displacements. In this case you do not need to think of signs, picture the memory map as a closed loop and think of "backwards" branches as going forward but taking the long way round the memory map.

Like instructions for conditional long branches have two byte op-codes, as well as needing a two byte displacement, so remember the same length when calculating displacements, backwards antisuitably.

Some monitors and all assemblers have the means of working out displacements for you, with some aid for you to tag or label the destination. At least one monitor will automatically select one or two byte values for long and normal branches, but many assemblers expect you to specify and throw up an error if a normal branch is out of range. What's more the process of assembly is sequential and for forward branches the destination label has not yet been found when a step to assemble the branch. This necessitates a second pass of some sort.

If you are stuck with a simple monitor, providing it gives a tabular memory dump

with a cursor, you can get a displacement quite easily by counting. The first stall to master is counting backwards in hex: P E D C B A 9 8 7 6 5 4 3 2 1 0. Perhaps you get "FED up with Counting Backwards 0111110110".

The table will give rows of 8, or more rarely 16, bytes. You get the first hex digit of the value by setting the cursor on the address after the displacement, and stepping vertically two rows at a time for rows of 8, or one for this, until you end up before the destination. Count backwards if going up, forwards for down. To get the second hex digit, count along forwards to the destination.

If you exceed 7 vertical steps forwards or pass it going back, you need a long branch. You then need to count pages to get the high byte of the displacement.

Note that to go 54000 forward you need a long branch with a displacement of 50 80. Don't be tempted to attempt displacements between 00 80 and 00 FF because you see a zero.

Removing JMPs (7C) and JBRs (8D) will prevent most crashes due to execution in the wrong place. These are, however, a few pitfalls left for the ambitious, that involve absolute addresses getting into registers and then into the program counter. A technique that can do this is to load a return address into a register and push it. This might be a "home" address for a multi-task program, whose routines and with an RTS and can be used as sub-routines or used direct. In the latter case the RTS puts the home address into the program counter and control returns to the main menu. In this case, or any TRR or ORG to the programmer's counter, the value must not be absolute.

Another cause of irreversibility in tables of data within the program coding. Move the program and the table pointer value will miss. Both this and the problem mentioned above can be resolved by using two of the 6800's most powerful features.

The designers of the 6800 decided that all the logic that services branches should be made available to the programmer. So firstly they introduced program counter relative addressing. Fancy and it is really a post-name for a system all processors use for at least two other functions, firstly the branch, which could be called jump PC relative (you call assemble an awkward instruction to do this, 66 PC rel). The second is our friend immediate, LDA. ■

LOAD AND GO WITH YOUR DRAGON

10 PROGRAMS FOR YOUR DRAGON

- Games: Pairs, Potions, Snakes and Ladders, Mr. Run, Castle Walls
- Homeworks: helpers, Spelling Tutor, Vocabulary tutor
- Graphics section: Full explanations of all Graphics commands with worked examples
- Hints and Tips
- How to debug programs



PHIPPS ASSOCIATES

Dept H FREE POST (M46) (No stamp)
172 Kingston Road, Farnell, Surrey KT19 0BB

Telephone 01-393 0285, 24 Hour answering.
Access and Visa cards welcome



Priorities include postage (outside Europe add £1.00 per item).

NEW

SPEECH and ADVANCED SOUND

for your Dragon 32 Computer
OUR HIGHLY SUCCESSFUL SPEECH & SOUND MODULES
NOW AVAILABLE IN ONE MODULE

- Combined module costs £65 inclusive of VAT & postage
- Modules also available separately. Speech module costs £29.95 inclusive. Sound Module costs £36.95 inclusive.
- Payment by cheque, postal order or ACCESS.
- At £65 inclusive of VAT & Postage, the combined module represents a considerable saving on the separate Modules.

FROM 2 to 2000

... is great used in education to in
... is perfect for use in the classroom
... is a very powerful package

What Micro - February 1988

- a well made cartridge
- comprehensive & easily understood manual
- a well designed
- a very powerful package



J. C. B. (Microsystems)

J.C.B. (MICROSYSTEMS)

28, Southdown Road - Bournemouth - BH4 5AE Tel: (0202) 423873

Order 12 (12) orders confirmed. 12 (12) orders for details.

TELEX NO. 81448 POC G

•**FN** is, in fact, loading PC relative to 0, that is, the byte following the op-code. Don't try it though, it will try to execute the data as well!

The next feature is load effective address. Instead of doing something with the location that is addressed in the chosen addressing mode, the address itself is put into the register. This puts all the circuits that give the powerful addressing modes of the 6800 in the hands of the programmer as a 16 bit number cruncher.

In our case we can put it all together to get an address within the program into a register irrespective of the program's position in the memory map. We can then point to tables, push return addresses and other tricks. We load effective address in the PC relative mode. Don't be fooled into thinking the 6800 is doing some magic, all it has to do is to add our displacement to the PC contents and put it into the chosen register.

All I have said about branch displacement applies to PC relative addressing displacements, so you now know how to make a program totally nomadic. Unfortunately all this makes it very hard to service. There is nothing like a few absolute addresses to show where you are going. Program development is easier with roots down so I recommend non-assembler programmers to use JMP relative ops—convert them later. However PC relative operations may need longer op-codes than their absolute equivalents. By popping in a NOP as padding in development, you don't alter the number of bytes when you convert and foul up other displacement values.

Most programs need work space, and you may want it to move with the program. To save a lot of PC relative hassle, you can set up a direct page relative to the program position and use it for workspace. The limitation is that you must only move the program in discrete 256 byte steps, and there is only one 256 byte page in relocatable workspace. What you do is set X to an address within the desired workspace page using LEAX PC,rel. Then TFR X to D, so the address high byte ends up in A. Then TFR A to the direct page register. From then on all direct addressing will point to workspace whose position relates to the program. Remember with the Dragon to reset DP to zero before returning to Basic.

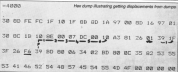
So, having shaken off the shackles of absolute addresses, your program can roam the RAM, hide in vacant memory and nap anything in sight. It's a pity Dragon's Basic wouldn't written this way, they wouldn't need the extra ROM for the 64K.

To end this article I am going to take an example which illustrates the points we have described, and perhaps you might find a few other things new to you in it too. The routine is written as a subroutine, as if it was part of a larger program or called from Basic, just to find a realistic way to end it! Unfortunately you cannot use it in its present form, mainly because it has divided itself from Basic by moving the direct page, and then hopes to use some Basic subroutines which themselves need

1. 38 8D FC FC	LEAX,PC	Long displacement of minus \$H184 to set X to start of work page.
2. 1F 10	TFR X D	16 bit transfer.
3. 1F 88	TFR A DPR	Direct Page register now set to page before program.
4. 8D 1A	BSR @17	Call subroutine to input and display character, all line 17.
5. 87 08	STA 80	Stores first input in workspace.
6. 8D 1A	BSR @17	Gets next character.
7. 87 01	STA	Stores second input.
8. 30 8C 1B	LEAX,PC	Loads X with start of Day Abbreviation data table.
9. 10 88 00 87	LDP 43	Initialises day count in Y.
10. 8C 00	LDD 80	Data both inputs from workspace into Double Accumulator.
11. 10 43 81	CMPP,X++	Compares D with first two letters in table, bumping X up by 2 to point at next element.
12. 26 01	BNE	If not found skip next instruction.
13. 38	RTS	End of routine if found.
14. 31 3F	LEAY Y	Decrement Y, using 4-bit offset indexing with Y as source reg.
15. 26 F6	BNE @H1	Backwards short branch if Y is not zero to repeat search.
16. 38	RTS	Program end, abbreviation not found.
17. 8D 88 88	JSR @H88	Call keyboard scan. Absolute address required as it is not within the routine.
18. 34 02	PORSE A	Preserve A from next subroutine.
19. 8D 88 8C	JSR @CH88	Echo character to screen. Also an absolute address.
20. 35 82	PULS A PC	Push A and PC off stack, acts to restore A and return.
21. 53 41 48 52 84 48 57 5A F8 1B WE 48 54 88 48 4F 53 55 7U 8D 3U		Day table in reverse order.

The program could be written with absolute addressing, in particular:

1. 86 3F 00	LDR #3F00	Fixes position of workspace, but there's a small advantage in using lines 1-3 in this case.
4. 8D 4D 24	JSR #8D4	Absolute address for input subroutine. Extended version assuming DPR not set by lines 1-3.
5. 87 3F 00	STA 3F00	Input another character.
6. 8D 4D 24	JSR #8D4	Store in next location.
7. 87 3F 01	STA 3F01	Absolute addressing of table.
8. 88 4D 2E	LDD #4D2E	Load D from workspace.
10. FC 3F 00	LDD 3F00	



the DP at zero. Regard it as an example only.

Its function is to accept two characters from the keyboard, echo them on the screen and reflect in the Y register which day of the week they stand for, 1 for Sunday up to 7 for Saturday, and 0 if the day is invalid.

The routines called from Basic are @H88, which waits for a key (press) and returns the ASCII of the key pressed in A, and @CH88 which prints the character at the cursor position. I assume it corrupts the contents of A for this example.

The program is totally nomadic, but

when I give the absolute addressing alternatives it is as if the origin is at \$H4000, and the work page will be \$H0F00 to \$H0FFF. I have numbered the instructions rather than line labels.

As there are no conditional jumps in the 6800 instruction set, there is no way to substitute for lines 12 and 15. However, you can substitute for long conditional branches during development by branching over an absolute jump.

I hope machine-code users have found a few tidbits in this article, even if it is ammunition against supporters of other processors! ■

TASK-SHIP

A new experience in computer graphics for the Dragon 32K. Features: you can 'swim', you can 'shoot', you can 'die'. 1 hour and 15 mins.



NINJA WARRIOR

Original Arcade game. Move fast! Only while hot to the Supreme warrior — Ninja Grandmaster.

PF

PROGRAM FACTORY LTD

are pleased to announce that they have acquired all rights to market Programmer's Quest software for the Dragon computer. In complement their existing range, Programmer's Quest is an American based company producing quality machine code programs. We have a wide range of software, including titles for the Cric 1/Colour Game, VIC 60, Spectrum, Dragon and T1-6000A, and they all come in attractive dustproof video cases. Call in at your local software dealer to view the games or contact us at the address below for 24-hour delivery. (Send stamped, addressed envelope for catalogue.)

TRADE ENQUIRIES TO YOUR LOCAL CONTRIBUTOR

PACDROIDS

The ultimate Pac action! The super fast & fast response action — supergraphics, super sounds, new high score 1000 points, multi-play easily 1000 — more 1000 — more features.



Listing software and hardware:

PROGRAM FACTORY LTD, 25, Rakeby Road, Daresbury, Lancashire.

Please visit the following games list (local). Choose a game to order from Program Factory Ltd. (Business include VAT, postage & packing.)

CRONOS 10K

☐ Learning

£1.95

☐ Ninja Warrior

£1.95

☐ Pacdroids

£1.95

Telephone orders, accept only credit card.

☐ Access

☐ Order

Name (BLOCK CAPITALS PLEASE)

Address

Postcode

Signature

screenplay



134 St. Vincent Street, Glasgow G2 5JU. Telephone 041-248 2481

MAD MONTY

IT'S MEALTIME FOR MONTY
AND FROGS ARE ON THE MENU !!

GUIDE THIS RAVENOUS PYTHON
AROUND THE GARDEN GULPING FROGS
AND MUNCHING MAGIC MUSHROOMS
BUT BEWARE OF THE POISONOUS
TOADSTOOLS.

KEEP YOUR COOL AND YOU MAY CATCH
A SPEEDY MOUSE FOR A DESERT!

THE ANIMATOR

IS YOUR DRAGON QUICK ON THE
DRAW?

CAN YOU "DO A DISNEY"?
NOW, THE ANSWER IS YES!!

WITH THE FLICK OF A CURSOR YOU
CAN CREATE YOUR OWN FULL COLOUR
CHARACTERS AND WATCH WITH
AMAZEMENT AS THEY SPRING INTO
LIFE IN YOUR VERY OWN USABLE
ROUTINES.

FROM SPREADING PALMS TO SPEEDING
SPACECRAFT . . . THE LIMIT IS YOUR
OWN IMAGINATION!

PRICE: £7.95

PRICE: £9.95

Available by Mail Order, from **SCREENPLAY**, 134 St. Vincent Street, Glasgow G2 5JU.
(Checks payable to **SCREENPLAY**)

Miscellaneous mains noises

K Garneil's techniques to prevent mains noise

FROM Q&A or two letters in previous issues of Dragon User, it is evident that there are fellow sufferers from the effects of mains noise. I can well remember that sinking feeling, wondering whether I should get the edit on tape before using the program. As well as being irritating, noise can cause very mysterious occurrences. In my own case one favourite was that erstwhile controlled I typed (produced "SA GARRR", what on other occasions it) signs seemed to be in it. Before going on to show how the effects of mains noise can be isolated, a word or two to consider just exactly what mains noise is.

I use the word "noise" generally, and perhaps a bit loosely, to mean either short disconnections of the supply, or high frequencies introduced into the mains supply by switching on other equipment, particularly motors. This high frequency noise can travel some distance along mains cables

and is not necessarily generated in your own home.

Short breaks in the mains supply are tolerable if the lights are on, and occasionally such short breaks will cause the TV picture to break up or even disappear momentarily. The Dragon, however, is very resistant to breaks of this sort. I have never had any trouble from this although my lights do flick occasionally.

No, the effect that does cause trouble, and to which the Dragon along with other machines is susceptible, are the high frequency components that occasionally appear. These components may be present on either the live or neutral lines or both.

There are two principle solutions to the problem, one of course noticeably cheaper than the other. However, neither solution is so expensive that one needs to continue the illustration of lost programs. As I

mentioned earlier, I was in the situation at one time that I could not be certain of completing an edit before using the program. Now that situation has completely changed. Programs work perfectly and I only have really complicated edits before taping.

The first solution to the problem is a simple filter, such as is shown in figure 1. This consists of two inductors L1 and L2 which are in series with the live and neutral from the mains. On the equipment side, one capacitor, C3, is connected between live and neutral and two others C1 and C2 are connected from live and neutral respectively down to earth. This configuration is very effective and is the one most commonly used for a wide variety of equipment which either generates interference or is susceptible to it. To simplify the way in which it works one may imagine the inductors as offering a barrier to the noise, whilst the capacitors bypass any remaining noise to the earth line.

The second solution, which is more expensive and consequently more effective, is an isolating transformer as shown in figure 2. T1 indicates the transformer, the primary of which is connected to the supply and the secondary to the equipment. A screen between the two windings further enhances the isolation. A toroidal transformer is most convenient because of its small size and low losses. This arrangement is very effective and indeed is the one I use.

Having discussed the two schemes we now come to the construction. This is quite straightforward for either and the components are readily available.

Figure 3 shows a constructional diagram of a filter unit. The capacitors C1, C2 and C3 are in fact encapsulated into one small module with three wires coming out, two coloured black (BK) and one

THE FILTER items and small plugs and sockets can be obtained from: MS Components Ltd, Ryeher House, Waring Street, West Horwood, London SE20 8LH.

Filter items

Cap No 201 suppressor 10p.

Cap No 204 suppressor £1.75.

Cap No 1000 socket 80p.

Cap No 1000 plug £1.20.

A plastic box large enough for the transformer and four of the 6-amp sockets (which

will have to be cut to fit) is Cap No 4000 grey plastic box 180 x 110 x 60mm £1.54.

WAT should be added to the above prices (at postage is included).

The transformer is obtainable from: G.P. Electronics Ltd, Graham Bell House, Roger Cross, Canterbury. Best CT2 TEP Transformer Part No 55555 costs £8.48 plus postage and packing £1.75.

WAT should be added to the above (£1.50) giving a total of £11.73. (All prices approximate.)

Figure 1: a simple solution to the problem of mains noise

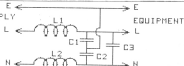
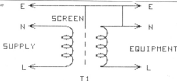


Figure 2: the more effective isolating transformer



Action Packed 100% Machine Code Arcade Software for DRAGON 32

PICTOS Droids



PICTOS uses the droids technology that should be known to those who will be using the world.

£8.95



MISSION XCI



You are the commander of the 88 Explorers, an intergalactic mission called MISSION XCI. Your orders are to land on the planet Xaphon in order to collect liquid Xaphonite, which is said to be needed for your planet's energy field. (Xaphon is a fictional planet.) However, the Xaphonians have already been using it, making an intergalactic battle inevitable which will destroy the planet. Another mission is that you must collect only 1000 Xaphonite, not 10000. (Xaphonite is a fictional substance.)

Another mission is that you must collect only 1000 Xaphonite, not 10000. (Xaphonite is a fictional substance.)

Another mission is that you must collect only 1000 Xaphonite, not 10000. (Xaphonite is a fictional substance.)

£8.95

Coming Next Month — 08/7/85

PICTOS Chess



PICTOS is a computer chess game that can be played on the Dragon 32. It is a very good game and is very easy to play.

£7.95

PICTOS Soccer



PICTOS Soccer is a very good game and is very easy to play. It is a very good game and is very easy to play.

£8.95

PICTOS Maffares



PICTOS Maffares is a very good game and is very easy to play. It is a very good game and is very easy to play.

£8.95

PICTOS Bonka



PICTOS Bonka is a very good game and is very easy to play. It is a very good game and is very easy to play.

£7.95

PICTOS Crusader



• Congratulations Terry Peam •
Terry Peam of Camberley in Surrey, after months of endeavour, is the very first of the thousands of intrepid Crusaders to reach the seventh and final screen. It can be done! You can make the attempt for only £8.95.

All orders dispatched by return 1st class post.

Orders over £100 require insurance.

Available from SPIC/PLUS and other good software stores.

J. Morrison (Micros) Ltd

DEPT 00584, 2 GLENDALE STREET, LEEDS LS9 9JJ
TELEPHONE (0532) 480487

ARCADE
ACTION

bloby computer games

WE WELCOME
YOUR QUALITY
PROGRAM SUBMISSIONS
AND PAY TOP
RETAIL PRICES

NOW BRINGS ARCADE ACTION TO ALL DRAGON 32 OWNERS
CAN YOU HANDLE THE ACTION?

LASER RUN DRAGON 32



LASER RUN — Fly your Defender against Earth's fiercest Cock Pits. 3-D graphics and Arcade action. £8.95

BARMY BURGERS DRAGON 32/64



BLABY COMPUTER GAMES

BARMY BURGERS — (Bops, Burgers, Cheese and Lettuce) — They are all there, all you have to do is put them together. It sounds easy doesn't it? But not when you are being chased by a hot egg and mutilated in 1. £8.95



BLABY COMPUTER GAMES

DODO — Starring Dodo and the Snow Bird — you are the last surviving breed of Dodo found in the Atlantic, surrounded by ice blocks and snow birds. Slide the ice blocks on to the Snow Bird to destroy the enemy in all time. £8.95
PLANET CONQUEST — Land your Frigate ship safely and then you may return to your real Solar System. (Sat levels etc.) £8.95

AVAILABLE FROM ALL GOOD COMPUTER STOCKISTS

DISTRIBUTORS/DEALERS/ENGINEERS WELCOME

DEPT 2, CROSSWAYS HOUSE, LUTTERWORTH ROAD, BLABY, LEICESTER
TELEPHONE (0533) 733641 TELEX 343029 JPMG

■green-yellow (GY). The inductors are also encapsulated, the module having four wires, two black and two blue (BB).

I constructed a unit from a standard double surface mounting box with two 13-amp sockets. These are available from electrical shops and many of the chain stores. The two modules are small enough to fit into the space behind the sockets. A length of three-core mains cable (5- or 6-amp) with a suitable plug completes the unit. The connections between this and the blue leads from the inductor module can be made by means of a small screw connector if you do not have access to a soldering iron. The connections are all shown in figure 3. It is important that the two black wires are connected to the mains supply via the cable and plug. The chief difficulty is getting the live and neutral connections the right way round because they are not distinguished on the inductor module. Some form of simple continuity test is required to find out which of the blue wires is connected to which of the socket connections. This is most easily done with

a multimeter or lamp and battery.

I have suggested using a ready made box but this does have the disadvantage of only two sockets. The inductor will handle up to 4 amps, which is sufficient for the equipment. The plug for the supply should be fused at 3 amps.

The second arrangement is just as easy to build, the only problem being that the transformer is too large to go into anything like the surface mounting box that I suggested for the filter unit. A piece of hard-board and a few minutes carpentry will solve this problem however. It also means that the box can be made big enough to accommodate more than two sockets. Standard 13-amp sockets can be used. Figure 4 shows the wiring. The two connections to the supply are coloured orange (OR) and the two connections to the socket are red (RD). There is no right and wrong way round for the wires so long as the orange wires go to the supply and the red to the socket. Again a small screw connector may be useful for connecting the transformer wires to the mains cable. Connections to other sockets are indicated

by the arrows. Yes, the drawing is correct, the neutral and earth connections of the socket are connected together. Fit a 3-amp fuse in the supply plug for this arrangement also.

The transformer is rated at 60va which is sufficient for the Dragon, tape recorder, printer and a small black and white portable TV. However, if you are using a large colour TV then it should be run direct from the mains supply, preferably from the same point that the transformer unit is plugged into. Use a two-way switch if necessary.

An alternative to 13-amp sockets, which are rather large, 6-amp sockets are available. They are about one and a quarter inches square and they take a later arrangement altogether, but remember plugs will be required as well. The sockets do into a rectangular hole.

Now which to use, the filter or the transformer? The best answer I can give is that if you have an occasional problem then the filter should be sufficient. Otherwise I would advise you to go for the transformer. ■

Figure 3: constructional diagram of a filter unit

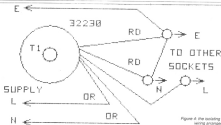
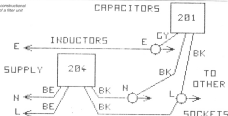


Figure 4: the isolating transformer's wiring arrangement

DON'T JUST PLAY GAMES!

EDUCATIONAL SOFTWARE

Physics (2-level CSE) Revision

Biology (2-level CSE) Revision

Computer Studies (2-level CSE)

Reading (Improver 9-10 years)

Mathematics (Practice 9-11 years)

Reasoning (9-11 + Revision)

Science (Revision 10-14 years)

English (Revision 10-14 years)

Maths (CSE Revision)

Spelling (Class 9-10 years)

Times (Practice 1-11 years)

Knowledge (Class 9-10 years)

English (Practice 10-14 years)

Automatic (Practice 10-14 years)

Maths (Revision 10-14 years)

Unbeatable value at £4.95 each. Post free.

'O' Level-CSE Computer Studies

A set of four cassette, lamp-coded with-to-date knowledge covering the 10 level-CSE syllabuses. Full notes with support questions.

Support areas include:

Data coding, Data Storage, Computer Arithmetic, Computer Logic, Processing Information, Security and Computers, Computer Structures, Backing Storage

and much, much more.

Also suitable as a general introduction to the computing world (Mums and Dads please note).

FANTASTIC VALUE AT £14.95 per set

PRO-FILE (X-85)

The cassette based filing system.

Hundreds of uses in the home. Easy-to-understand 50-page manual. Design your own file layout.

"Fast computer is actually useful" (CPM July 83)

"Pro-file does everything I claim, and does it well" (CPM Nov/December 1983)

"One of the best manuals of its type I have seen, ideal for the novice" (CPM December 83).

Chapters and CDs:

MICRO-DE-BUG CONSULTANCY

Dept. U, 80 St. John's Road, Selly Oaks, Birmingham B29 6LR. Tel: 021-472 7616

WINDRUSH MICRO SYSTEMS



BUG ZAPPER



MACE



D-BUG

BUG ZAPPER A unique and original educational software for the IBM PC, XT, AT and compatible systems. It is the only software of its kind to be designed specifically for the IBM PC. The program teaches the user how to use the computer and the keyboard. It also teaches the user how to use the mouse. The program is designed to be used by children aged 8-12 years.

MACE A unique and original educational software for the IBM PC, XT, AT and compatible systems. It is the only software of its kind to be designed specifically for the IBM PC. The program teaches the user how to use the computer and the keyboard. It also teaches the user how to use the mouse. The program is designed to be used by children aged 8-12 years.

D-BUG A unique and original educational software for the IBM PC, XT, AT and compatible systems. It is the only software of its kind to be designed specifically for the IBM PC. The program teaches the user how to use the computer and the keyboard. It also teaches the user how to use the mouse. The program is designed to be used by children aged 8-12 years.

BUG ZAPPER A unique and original educational software for the IBM PC, XT, AT and compatible systems. It is the only software of its kind to be designed specifically for the IBM PC. The program teaches the user how to use the computer and the keyboard. It also teaches the user how to use the mouse. The program is designed to be used by children aged 8-12 years.

MACE A unique and original educational software for the IBM PC, XT, AT and compatible systems. It is the only software of its kind to be designed specifically for the IBM PC. The program teaches the user how to use the computer and the keyboard. It also teaches the user how to use the mouse. The program is designed to be used by children aged 8-12 years.

D-BUG A unique and original educational software for the IBM PC, XT, AT and compatible systems. It is the only software of its kind to be designed specifically for the IBM PC. The program teaches the user how to use the computer and the keyboard. It also teaches the user how to use the mouse. The program is designed to be used by children aged 8-12 years.

BUG ZAPPER A unique and original educational software for the IBM PC, XT, AT and compatible systems. It is the only software of its kind to be designed specifically for the IBM PC. The program teaches the user how to use the computer and the keyboard. It also teaches the user how to use the mouse. The program is designed to be used by children aged 8-12 years.

A NEW, LOW COST, EDUCATIONAL, MULTI-PURPOSE INTERFACE SYSTEM FOR DATA-ACQUISITION AND PROCESS CONTROL

DESIGNED AND DEVELOPED TO A HIGH PROFESSIONAL STANDARD FOR USE
AT HOME, IN SCHOOLS, COLLEGES, UNIVERSITIES, ETC.

Numerous applications around the home, in the classrooms, and laboratory. This unit is capable of doing several jobs at once but is simple to use and understand.

Comes as a complete, easy to assemble kit using only highest quality components, with a large well-written and practical instruction manual. No other external components or batteries are needed.

Learn about the mysteries of microprocessor control, data acquisition and general interfacing techniques in a practical way using modern powerful semiconductor devices.

A selection of basic and machine-code programs are included for the operation of the interface.

Extensive application notes and ideas for further development are also provided.

AVAILABLE MAIL-ORDER ONLY:

PLEASE ALLOW 28 DAYS FOR DELIVERY

PRICE £39.95 (PLUS 50p P&P + VAT)

Technical specifications:

6821 Peripheral Interface Adaptor (PIA), two 8-bit data I/O ports with four handshake lines, full use of six internal data registers.

Analogue-to-Digital Converter (ADC), bipolar 8-bit operation with 10 μ s conversion time, handshaking control of data conversion process, adjustable input voltage range (500 mV to 50 V) 0-4% full-scale resolution.

Digital-to-Analogue Converter (DAC), unipolar and bipolar output modes, 8-bit resolution and internal 2.5 volt precision voltage reference, adjustable buffered analogue output voltage.

16-bar LED array visual display and power indicators.

Electromechanical 28V 3A relay.

ELECTROANALYTICAL TECHNOLOGY,

8 ACCESS ROAD, WEST DERRY,
LIVERPOOL L12 5YH.

MAIL ORDER ONLY
PLEASE ALLOW 28 DAYS FOR DELIVERY

OPEN FILE FOR DRAGON USERS

Send us your Dragon programs, beginning with a general description and then explaining how the program is constructed. Take care that the listings are all bug-free, enclosing a cassette and, if possible, a printout. We pay £5 for each bug-free program published, double for the program of the month. If you have any problems with the listings, please send your queries to the appropriate author, Dragon User, 12-13 Little Newport Street, London WC2H 3LD.

String Input

From John Boyes in Liverpool

This SHORT program enables one to input a character string using the right joystick in a manner similar to that used in some arcade games.

You may notice that the program uses a few tricks which are available to users but are not explained in the manual. In fact they are not covered in any of the books on the Commodore Computer either.

```
5 REM JOYSTICK STRING INPUT -- J. BOYES, -- NOV 83.
10 CLS:MM="":FOR I=0 TO 29
20 P=22450+I*INT(1/6)*2
30 IF I/26 THEN PRINT @J,CHR$(254); ELSE READ A$;PRINT P,A$
40 DATA " ", " ", " ", "RUB", "END";NEXT I:I=I-24488+224
50 A=PEEK(3450+I*INT(1/6)*2)
55 A=A-16 OR 64)-16 AND 64) *SPACES$;ESSENTIAL
60 POKE 3450+I*INT(1/6)*2,A
70 FOR K=0 TO 144-A:NEXT K
80 IF NOT A AND 64 THEN 50 *SPACES$;ESSENTIAL
90 A=JOYSTK(0) ;B=(A/15)-(A/48)
95 IF K THEN SOUND 220,100-10K:I=I-300+(160)-(I/29)
100 IF PEEK(45000) AND 1 THEN 50 *SPACES$;ESSENTIAL
110 IF I/26 THEN MM=MM+CHR$(65+I);ELSE IF I/29 THEN MM=MM+CHR$(145-154*(I/29)) ELSE IF I/29 THEN 130 ELSE IF MM="" THEN MM="EPTA (MM,LEN(MM)-1)
120 PRINT @100,MM;SOUND 1,1;GOTO 50
130 END
```

Nimitron

From V M Jamcoji in Surrey

THIS COMPUTER game is based upon the ancient Chinese game of Hsiao. It is a game of strategy and planning. You play against the computer to eat the stars from the board and the winner is the one who eats the last star. At the end of the game the percentage of games that you have won is displayed along with the corresponding skill rating. Sound and colour are used in the game.

To save readers the trouble of typing in the program, copies are available, on cassette, price £3 (including p&g) from V M Jamcoji, 32 St Albans Road, Chesham, Surrey.

Program notes

95-120 Reserves string storage and gives a welcome to the game.
130-160 Gives instructions if needed.
160-180 Sets the number of games.

200-230
240-260
300-330

360
400

410
420-490

700
710-760

770

790-800

810

820

830

840

850

To be played.

Orders the board.

Who plays first?

Player enters moves (checks are made to see if it's legal).

Updates board.

Reorders the updated board.

Checks for a win.

Logic to determine computer's move.

Checks for a win.

Output computer's move and redraw the board.

Returns control to 360 as player can enter next move.

Special part of computer's "logic".

Computer loses — score updated, message printed, control transferred.

Computer wins — score updated, message printed, control transferred.

Pause (to read message); control loops back to start of game.

Score converted to a percentage.

Percentage outputted.

850-910

920-950

960-980

990-1140

1150-1230

1230-1260

Corresponding skill level calculated.

"Game over".

Input of data subroutine.

Instructions subroutine.

Board printing subroutine.

Data for skill ratings.

Variables

Y1

Y1

Y2

Y3

SCORE

PER

A\$

B\$

A/I(1),2),3)

I

J

M

N0

RE

Markers used to determine the computer's logic.

Score of the player. Percentage scored by player.

Name of player. General purpose input string.

Stores the board on which the game is played.

General purpose counter. Counts number of games played.

Marker for positioning of board on screen.

Number of games to be played.

Variable to register how

May 1984 Dragon User 49

RD	Many stars a player receives from the board. Variable to register which	RD	How the stars were removed from. Computer's equivalent to	RD	Computer's equivalent to
10	*****				
20	NAME MINITRON *				
30	BY-- *				
40	V, JAM0031 *				
50	*				
60	DATE: 11/1/84 *				
70	*****				
80	*****				
90	CLEAR500:CLS:PRINT"PLEASE TYPE IN YOUR NAME":INPUTA\$:SOUND100,1				
100	CLS:PRINT\$A\$,"WELCOME TO THE GAME OF MINIT":PRINT\$A\$,A\$				
110	DE="00L466L266L466L266L46600L300L40000L1AL46600L30000L466L266L466L266L466L				
120	PLAY"10"-86:CLS				
130	PRINT"WOULD YOU LIKE INSTRUCTIONS"				
140	GO\$UP\$40				
150	IF\$="Y"THEN\$GO\$UP\$40				
160	CLS:PRINT"HOW MANY GAMES DO YOU WANT"				
170	PRINT"TO PLAY ":A\$:GO\$UP\$40				
180	N0=VAL(B\$)				
190	FOR I=1 TO N0				
200	CLS:PRINT\$0,"GAME "I I;				
210	PRINT\$02,"*****";				
220	FOR J=1 TO 3:R(1)=RND(16)+1:NEXT J				
230	N=50:GO\$UP\$150				
240	PRINT\$113,"DO YOU WANT TO"				
250	PRINT\$145,"PLAY FIRST ?"				
260	GO\$UP\$40				
270	PRINT\$113," "				
280	PRINT\$145," "				
290	IF\$="Y"THEN\$00L\$E\$420				
300	PRINT:PRINT\$347,"REMOVE ?":GO\$UP\$40				
310	N=N-1				
320	RE=VAL(B\$)				
330	PRINT\$1," "				
340	PRINT\$401,"ROW "I":GO\$UP\$40				
350	RD=VAL(B\$)				
360	PRINT\$0;				
370	IF\$<10AND\$>0THEN\$N=N-1:GO\$000				
380	IF\$<10AND\$>400 THEN\$N=N-1:GO\$0300				
390	A(RD)=A(RD)-RE				
400	N=N+1:CLS:PRINT\$0,"GAME "I I;:PRINT\$02,"*****";:GO\$UP\$150				
410	IF A(1)<0AND\$A(2)<0AND\$A(3)<0THEN\$110				
420	V1=0:Y1=0:Y2=0:Y3=0				
430	IF A(1)=A(2)AND\$A(3)>0THEN\$090				
440	IF A(2)=A(3)AND\$A(1)>0THEN\$020				
450	IF A(1)=A(3)AND\$A(2)>0THEN\$050				
460	FOR J=1 TO 3				
470	IF A(J)<1AND\$A(1)<0AND\$A(1)<40\$A(1):\$THEN\$490				
480	V1=V1+1				
490	NEXT J				
500	IF V1>0THEN\$090				
510	IF A(1)=A(2) THEN\$Y1=A(1)-A(2)ELSE\$Y1=A(2)-A(3)				
520	IF A(2)=A(3) THEN\$Y2=A(2)-A(3)ELSE\$Y2=A(3)-A(1)				
530	IF A(1)=A(3) THEN\$Y3=A(1)-A(3)ELSE\$Y3=A(3)-A(1)				
540	IF A(3)>=Y1 AND A(3)>0 THEN\$090				
550	IF A(1)>=Y2 AND A(1)>0 THEN\$090				
560	N=A(2)+Y3				
570	I=2				
580	GO\$060				
590	N=A(3)+Y1				
600	I=3				
610	GO\$060				
620	N=A(1)+Y2				
630	I=1				
640	IF V1<0THEN\$060				
650	N=A(1)+3:GO\$060				

Continued on page 51

TAKE THE WEIGHT OFF YOUR DRAGON

WITH OUR CUSTOM-MADE MONITOR STAND

FEATURES INCLUDE:

- Strong aluminium construction
- Electrostatically applied paint finish
 - Non-slip feet to protect work surface
 - Lightweight and durable



£12.50

VAT, P&P INCLUDED.

BLOOMFIELD HUSSEY
Postpaid
Harpenden, Herts AL5 2BR

AND NOW FOR SOMETHING COMPLETELY DIFFERENT!

THE CHOCOLATE FACTORY

for
DRAGON 32 or 64

- ★ TOTALLY ADDICTIVE
- ★ HIGHLY SKILFUL
- ★ REALISTIC
- ★ EDUCATIONAL
- ★ INCLUDES MANY OPTIONS



You too can learn how top business works with this exciting and addictive game for 2 to 4 players, expert 1 and onwards. You'll be playing this long after you're tired of monster games!

Attractively packaged cassette for £5.95. Available from Minits or post free from Minits Ltd, 51 Ward House, Great West Road, Brentford, Middlesex.

COMPUTER BUFFS: Top royalties paid for original programs.

Send your cassette for review to Minits Ltd.

POPULAR ⁱⁿ Computing WEEKLY

★ CLASSIFIEDS ★

- Popular Computing Weekly was voted magazine of the year by the CTA.
- It's Britain's only weekly home computer magazine with a published Audit Bureau of Circulation sales figure.
- It has a classified section that is now required reading for everyone with an interest in email, micro, or who wants to buy or sell: **SOFTWARE** • **UTILITIES** • **ACCESSORIES** • **SERVICES** • **HARDWARE** • **HIRING** • **CLUBS** • **RECRUITMENT** •
- £5 per SCC semi-display, 26p per word lineage.
- 6 day-copy date.

CALL DAVID DAVIS ON 01-437 4343 FOR AN IMMEDIATE QUOTE.

Popular Computing Weekly, Sunbeam,
10/11 Little Newport Street, London WC2P 2LD



Wizard Software

SPECIAL OFFER

ANY 3 GAMES £15.00
ANY 4 GAMES £20.00



STRATEGY **NEW** £14.95

A huge computer chess program for 1-4 players. Don't stop at the normal 8 x 8, or 9 x 9, or 10 x 10, or 11 x 11, or 12 x 12, or 13 x 13, or 14 x 14, or 15 x 15, or 16 x 16, or 17 x 17, or 18 x 18, or 19 x 19, or 20 x 20, or 21 x 21, or 22 x 22, or 23 x 23, or 24 x 24, or 25 x 25, or 26 x 26, or 27 x 27, or 28 x 28, or 29 x 29, or 30 x 30, or 31 x 31, or 32 x 32, or 33 x 33, or 34 x 34, or 35 x 35, or 36 x 36, or 37 x 37, or 38 x 38, or 39 x 39, or 40 x 40, or 41 x 41, or 42 x 42, or 43 x 43, or 44 x 44, or 45 x 45, or 46 x 46, or 47 x 47, or 48 x 48, or 49 x 49, or 50 x 50, or 51 x 51, or 52 x 52, or 53 x 53, or 54 x 54, or 55 x 55, or 56 x 56, or 57 x 57, or 58 x 58, or 59 x 59, or 60 x 60, or 61 x 61, or 62 x 62, or 63 x 63, or 64 x 64, or 65 x 65, or 66 x 66, or 67 x 67, or 68 x 68, or 69 x 69, or 70 x 70, or 71 x 71, or 72 x 72, or 73 x 73, or 74 x 74, or 75 x 75, or 76 x 76, or 77 x 77, or 78 x 78, or 79 x 79, or 80 x 80, or 81 x 81, or 82 x 82, or 83 x 83, or 84 x 84, or 85 x 85, or 86 x 86, or 87 x 87, or 88 x 88, or 89 x 89, or 90 x 90, or 91 x 91, or 92 x 92, or 93 x 93, or 94 x 94, or 95 x 95, or 96 x 96, or 97 x 97, or 98 x 98, or 99 x 99, or 100 x 100, or 101 x 101, or 102 x 102, or 103 x 103, or 104 x 104, or 105 x 105, or 106 x 106, or 107 x 107, or 108 x 108, or 109 x 109, or 110 x 110, or 111 x 111, or 112 x 112, or 113 x 113, or 114 x 114, or 115 x 115, or 116 x 116, or 117 x 117, or 118 x 118, or 119 x 119, or 120 x 120, or 121 x 121, or 122 x 122, or 123 x 123, or 124 x 124, or 125 x 125, or 126 x 126, or 127 x 127, or 128 x 128, or 129 x 129, or 130 x 130, or 131 x 131, or 132 x 132, or 133 x 133, or 134 x 134, or 135 x 135, or 136 x 136, or 137 x 137, or 138 x 138, or 139 x 139, or 140 x 140, or 141 x 141, or 142 x 142, or 143 x 143, or 144 x 144, or 145 x 145, or 146 x 146, or 147 x 147, or 148 x 148, or 149 x 149, or 150 x 150, or 151 x 151, or 152 x 152, or 153 x 153, or 154 x 154, or 155 x 155, or 156 x 156, or 157 x 157, or 158 x 158, or 159 x 159, or 160 x 160, or 161 x 161, or 162 x 162, or 163 x 163, or 164 x 164, or 165 x 165, or 166 x 166, or 167 x 167, or 168 x 168, or 169 x 169, or 170 x 170, or 171 x 171, or 172 x 172, or 173 x 173, or 174 x 174, or 175 x 175, or 176 x 176, or 177 x 177, or 178 x 178, or 179 x 179, or 180 x 180, or 181 x 181, or 182 x 182, or 183 x 183, or 184 x 184, or 185 x 185, or 186 x 186, or 187 x 187, or 188 x 188, or 189 x 189, or 190 x 190, or 191 x 191, or 192 x 192, or 193 x 193, or 194 x 194, or 195 x 195, or 196 x 196, or 197 x 197, or 198 x 198, or 199 x 199, or 200 x 200, or 201 x 201, or 202 x 202, or 203 x 203, or 204 x 204, or 205 x 205, or 206 x 206, or 207 x 207, or 208 x 208, or 209 x 209, or 210 x 210, or 211 x 211, or 212 x 212, or 213 x 213, or 214 x 214, or 215 x 215, or 216 x 216, or 217 x 217, or 218 x 218, or 219 x 219, or 220 x 220, or 221 x 221, or 222 x 222, or 223 x 223, or 224 x 224, or 225 x 225, or 226 x 226, or 227 x 227, or 228 x 228, or 229 x 229, or 230 x 230, or 231 x 231, or 232 x 232, or 233 x 233, or 234 x 234, or 235 x 235, or 236 x 236, or 237 x 237, or 238 x 238, or 239 x 239, or 240 x 240, or 241 x 241, or 242 x 242, or 243 x 243, or 244 x 244, or 245 x 245, or 246 x 246, or 247 x 247, or 248 x 248, or 249 x 249, or 250 x 250, or 251 x 251, or 252 x 252, or 253 x 253, or 254 x 254, or 255 x 255, or 256 x 256, or 257 x 257, or 258 x 258, or 259 x 259, or 260 x 260, or 261 x 261, or 262 x 262, or 263 x 263, or 264 x 264, or 265 x 265, or 266 x 266, or 267 x 267, or 268 x 268, or 269 x 269, or 270 x 270, or 271 x 271, or 272 x 272, or 273 x 273, or 274 x 274, or 275 x 275, or 276 x 276, or 277 x 277, or 278 x 278, or 279 x 279, or 280 x 280, or 281 x 281, or 282 x 282, or 283 x 283, or 284 x 284, or 285 x 285, or 286 x 286, or 287 x 287, or 288 x 288, or 289 x 289, or 290 x 290, or 291 x 291, or 292 x 292, or 293 x 293, or 294 x 294, or 295 x 295, or 296 x 296, or 297 x 297, or 298 x 298, or 299 x 299, or 300 x 300, or 301 x 301, or 302 x 302, or 303 x 303, or 304 x 304, or 305 x 305, or 306 x 306, or 307 x 307, or 308 x 308, or 309 x 309, or 310 x 310, or 311 x 311, or 312 x 312, or 313 x 313, or 314 x 314, or 315 x 315, or 316 x 316, or 317 x 317, or 318 x 318, or 319 x 319, or 320 x 320, or 321 x 321, or 322 x 322, or 323 x 323, or 324 x 324, or 325 x 325, or 326 x 326, or 327 x 327, or 328 x 328, or 329 x 329, or 330 x 330, or 331 x 331, or 332 x 332, or 333 x 333, or 334 x 334, or 335 x 335, or 336 x 336, or 337 x 337, or 338 x 338, or 339 x 339, or 340 x 340, or 341 x 341, or 342 x 342, or 343 x 343, or 344 x 344, or 345 x 345, or 346 x 346, or 347 x 347, or 348 x 348, or 349 x 349, or 350 x 350, or 351 x 351, or 352 x 352, or 353 x 353, or 354 x 354, or 355 x 355, or 356 x 356, or 357 x 357, or 358 x 358, or 359 x 359, or 360 x 360, or 361 x 361, or 362 x 362, or 363 x 363, or 364 x 364, or 365 x 365, or 366 x 366, or 367 x 367, or 368 x 368, or 369 x 369, or 370 x 370, or 371 x 371, or 372 x 372, or 373 x 373, or 374 x 374, or 375 x 375, or 376 x 376, or 377 x 377, or 378 x 378, or 379 x 379, or 380 x 380, or 381 x 381, or 382 x 382, or 383 x 383, or 384 x 384, or 385 x 385, or 386 x 386, or 387 x 387, or 388 x 388, or 389 x 389, or 390 x 390, or 391 x 391, or 392 x 392, or 393 x 393, or 394 x 394, or 395 x 395, or 396 x 396, or 397 x 397, or 398 x 398, or 399 x 399, or 400 x 400, or 401 x 401, or 402 x 402, or 403 x 403, or 404 x 404, or 405 x 405, or 406 x 406, or 407 x 407, or 408 x 408, or 409 x 409, or 410 x 410, or 411 x 411, or 412 x 412, or 413 x 413, or 414 x 414, or 415 x 415, or 416 x 416, or 417 x 417, or 418 x 418, or 419 x 419, or 420 x 420, or 421 x 421, or 422 x 422, or 423 x 423, or 424 x 424, or 425 x 425, or 426 x 426, or 427 x 427, or 428 x 428, or 429 x 429, or 430 x 430, or 431 x 431, or 432 x 432, or 433 x 433, or 434 x 434, or 435 x 435, or 436 x 436, or 437 x 437, or 438 x 438, or 439 x 439, or 440 x 440, or 441 x 441, or 442 x 442, or 443 x 443, or 444 x 444, or 445 x 445, or 446 x 446, or 447 x 447, or 448 x 448, or 449 x 449, or 450 x 450, or 451 x 451, or 452 x 452, or 453 x 453, or 454 x 454, or 455 x 455, or 456 x 456, or 457 x 457, or 458 x 458, or 459 x 459, or 460 x 460, or 461 x 461, or 462 x 462, or 463 x 463, or 464 x 464, or 465 x 465, or 466 x 466, or 467 x 467, or 468 x 468, or 469 x 469, or 470 x 470, or 471 x 471, or 472 x 472, or 473 x 473, or 474 x 474, or 475 x 475, or 476 x 476, or 477 x 477, or 478 x 478, or 479 x 479, or 480 x 480, or 481 x 481, or 482 x 482, or 483 x 483, or 484 x 484, or 485 x 485, or 486 x 486, or 487 x 487, or 488 x 488, or 489 x 489, or 490 x 490, or 491 x 491, or 492 x 492, or 493 x 493, or 494 x 494, or 495 x 495, or 496 x 496, or 497 x 497, or 498 x 498, or 499 x 499, or 500 x 500, or 501 x 501, or 502 x 502, or 503 x 503, or 504 x 504, or 505 x 505, or 506 x 506, or 507 x 507, or 508 x 508, or 509 x 509, or 510 x 510, or 511 x 511, or 512 x 512, or 513 x 513, or 514 x 514, or 515 x 515, or 516 x 516, or 517 x 517, or 518 x 518, or 519 x 519, or 520 x 520, or 521 x 521, or 522 x 522, or 523 x 523, or 524 x 524, or 525 x 525, or 526 x 526, or 527 x 527, or 528 x 528, or 529 x 529, or 530 x 530, or 531 x 531, or 532 x 532, or 533 x 533, or 534 x 534, or 535 x 535, or 536 x 536, or 537 x 537, or 538 x 538, or 539 x 539, or 540 x 540, or 541 x 541, or 542 x 542, or 543 x 543, or 544 x 544, or 545 x 545, or 546 x 546, or 547 x 547, or 548 x 548, or 549 x 549, or 550 x 550, or 551 x 551, or 552 x 552, or 553 x 553, or 554 x 554, or 555 x 555, or 556 x 556, or 557 x 557, or 558 x 558, or 559 x 559, or 560 x 560, or 561 x 561, or 562 x 562, or 563 x 563, or 564 x 564, or 565 x 565, or 566 x 566, or 567 x 567, or 568 x 568, or 569 x 569, or 570 x 570, or 571 x 571, or 572 x 572, or 573 x 573, or 574 x 574, or 575 x 575, or 576 x 576, or 577 x 577, or 578 x 578, or 579 x 579, or 580 x 580, or 581 x 581, or 582 x 582, or 583 x 583, or 584 x 584, or 585 x 585, or 586 x 586, or 587 x 587, or 588 x 588, or 589 x 589, or 590 x 590, or 591 x 591, or 592 x 592, or 593 x 593, or 594 x 594, or 595 x 595, or 596 x 596, or 597 x 597, or 598 x 598, or 599 x 599, or 600 x 600, or 601 x 601, or 602 x 602, or 603 x 603, or 604 x 604, or 605 x 605, or 606 x 606, or 607 x 607, or 608 x 608, or 609 x 609, or 610 x 610, or 611 x 611, or 612 x 612, or 613 x 613, or 614 x 614, or 615 x 615, or 616 x 616, or 617 x 617, or 618 x 618, or 619 x 619, or 620 x 620, or 621 x 621, or 622 x 622, or 623 x 623, or 624 x 624, or 625 x 625, or 626 x 626, or 627 x 627, or 628 x 628, or 629 x 629, or 630 x 630, or 631 x 631, or 632 x 632, or 633 x 633, or 634 x 634, or 635 x 635, or 636 x 636, or 637 x 637, or 638 x 638, or 639 x 639, or 640 x 640, or 641 x 641, or 642 x 642, or 643 x 643, or 644 x 644, or 645 x 645, or 646 x 646, or 647 x 647, or 648 x 648, or 649 x 649, or 650 x 650, or 651 x 651, or 652 x 652, or 653 x 653, or 654 x 654, or 655 x 655, or 656 x 656, or 657 x 657, or 658 x 658, or 659 x 659, or 660 x 660, or 661 x 661, or 662 x 662, or 663 x 663, or 664 x 664, or 665 x 665, or 666 x 666, or 667 x 667, or 668 x 668, or 669 x 669, or 670 x 670, or 671 x 671, or 672 x 672, or 673 x 673, or 674 x 674, or 675 x 675, or 676 x 676, or 677 x 677, or 678 x 678, or 679 x 679, or 680 x 680, or 681 x 681, or 682 x 682, or 683 x 683, or 684 x 684, or 685 x 685, or 686 x 686, or 687 x 687, or 688 x 688, or 689 x 689, or 690 x 690, or 691 x 691, or 692 x 692, or 693 x 693, or 694 x 694, or 695 x 695, or 696 x 696, or 697 x 697, or 698 x 698, or 699 x 699, or 700 x 700, or 701 x 701, or 702 x 702, or 703 x 703, or 704 x 704, or 705 x 705, or 706 x 706, or 707 x 707, or 708 x 708, or 709 x 709, or 710 x 710, or 711 x 711, or 712 x 712, or 713 x 713, or 714 x 714, or 715 x 715, or 716 x 716, or 717 x 717, or 718 x 718, or 719 x 719, or 720 x 720, or 721 x 721, or 722 x 722, or 723 x 723, or 724 x 724, or 725 x 725, or 726 x 726, or 727 x 727, or 728 x 728, or 729 x 729, or 730 x 730, or 731 x 731, or 732 x 732, or 733 x 733, or 734 x 734, or 735 x 735, or 736 x 736, or 737 x 737, or 738 x 738, or 739 x 739, or 740 x 740, or 741 x 741, or 742 x 742, or 743 x 743, or 744 x 744, or 745 x 745, or 746 x 746, or 747 x 747, or 748 x 748, or 749 x 749, or 750 x 750, or 751 x 751, or 752 x 752, or 753 x 753, or 754 x 754, or 755 x 755, or 756 x 756, or 757 x 757, or 758 x 758, or 759 x 759, or 760 x 760, or 761 x 761, or 762 x 762, or 763 x 763, or 764 x 764, or 765 x 765, or 766 x 766, or 767 x 767, or 768 x 768, or 769 x 769, or 770 x 770, or 771 x 771, or 772 x 772, or 773 x 773, or 774 x 774, or 775 x 775, or 776 x 776, or 777 x 777, or 778 x 778, or 779 x 779, or 780 x 780, or 781 x 781, or 782 x 782, or 783 x 783, or 784 x 784, or 785 x 785, or 786 x 786, or 787 x 787, or 788 x 788, or 789 x 789, or 790 x 790, or 791 x 791, or 792 x 792, or 793 x 793, or 794 x 794, or 795 x 795, or 796 x 796, or 797 x 797, or 798 x 798, or 799 x 799, or 800 x 800, or 801 x 801, or 802 x 802, or 803 x 803, or 804 x 804, or 805 x 805, or 806 x 806, or 807 x 807, or 808 x 808, or 809 x 809, or 810 x 810, or 811 x 811, or 812 x 812, or 813 x 813, or 814 x 814, or 815 x 815, or 816 x 816, or 817 x 817, or 818 x 818, or 819 x 819, or 820 x 820, or 821 x 821, or 822 x 822, or 823 x 823, or 824 x 824, or 825 x 825, or 826 x 826, or 827 x 827, or 828 x 828, or 829 x 829, or 830 x 830, or 831 x 831, or 832 x 832, or 833 x 833, or 834 x 834, or 835 x 835, or 836 x 836, or 837 x 837, or 838 x 838, or 839 x 839, or 840 x 840, or 841 x 841, or 842 x 842, or 843 x 843, or 844 x 844, or 845 x 845, or 846 x 846, or 847 x 847, or 848 x 848, or 849 x 849, or 850 x 850, or 851 x 851, or 852 x 852, or 853 x 853, or 854 x 854, or 855 x 855, or 856 x 856, or 857 x 857, or 858 x 858, or 859 x 859, or 860 x 860, or 861 x 861, or 862 x 862, or 863 x 863, or 864 x 864, or 865 x 865, or 866 x 866, or 867 x 867, or 868 x 868, or 869 x 869, or 870 x 870, or 871 x 871, or 872 x 872, or 873 x 873, or 874 x 874, or 875 x 875, or 876 x 876, or 877 x 877, or 878 x 878, or 879 x 879, or 880 x 880, or 881 x 881, or 882 x 882, or 883 x 883, or 884 x 884, or 885 x 885, or 886 x 886, or 887 x 887, or 888 x 888, or 889 x 889, or 890 x 890, or 891 x 891, or 892 x 892, or 893 x 893, or 894 x 894, or 895 x 895, or 896 x 896, or 897 x 897, or 898 x 898, or 899 x 899, or 900 x 900, or 901 x 901, or 902 x 902, or 903 x 903, or 904 x 904, or 905 x 905, or 906 x 906, or 907 x 907, or 908 x 908, or 909 x 909, or 910 x 910, or 911 x 911, or 912 x 912, or 913 x 913, or 914 x 914, or 915 x 915, or 916 x 916, or 917 x 917, or 918 x 918, or 919 x 919, or 920 x 920, or 921 x 921, or 922 x 922, or 923 x 923, or 924 x 924, or 925 x 925, or 926 x 926, or 927 x 927, or 928 x 928, or 929 x 929, or 930 x 930, or 931 x 931, or 932 x 932, or 933 x 933, or 934 x 934, or 935 x 935, or 936 x 936, or 937 x 937, or 938 x 938, or 939 x 939, or 940 x 940, or 941 x 941, or 942 x 942, or 943 x 943, or 944 x 944, or 945 x 945, or 946 x 946, or 947 x 947, or 948 x 948, or 949 x 949, or 950 x 950, or 951 x 951, or 952 x 952, or 953 x 953, or 954 x 954, or 955 x 955, or 956 x 956, or 957 x 957, or 958 x 958, or 959 x 959, or 960 x 960, or 961 x 961, or 962 x 962, or 963 x 963, or 964 x 964, or 965 x 965, or 966 x 966, or 967 x 967, or 968 x 968, or 969 x 969, or 970 x 970, or 971 x 971, or 972 x 972, or 973 x 973, or 974 x 974, or 975 x 975, or 976 x 976, or 977 x 977, or 978 x 978, or 979 x 979, or 980 x 980, or 981 x 981, or 982 x 982, or 983 x 983, or 984 x 984, or 985 x 985, or 986 x 9

PERSONAL ACCOUNTS PROGRAM
Age 18-24 ONLY

- Large capacity: up to 180 files, each with up to 99 periods, up to 100 transactions per period. Periods user-defined (eg, month/fortnight/week).
- Password protection for tape files, editing and automatic date-sorting of transactions.
- Up to 10 sources of funds per file, plus up to 10 income accounts and 30 expenditure accounts. Account names can be changed to suit your needs.
- Five reports, to screen or 40x60 dot printer. Current balances; shows eg, net worth. Forecasts; eg, estimate year-end balances, income, eg, the all-included receipts. Expenditure; eg, the all-included payments. Amount Payments; shows your bank accounts, etc.

ALL PRICES ONLY V.P. 99 INCL. VAT

© 2005 Blackwell Publishing Ltd *Journal of Internal Medicine* 258: 105–112

HARRIS MICRO SOFTWARE

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 103–110



CRICKET

000000 00—0000



40-OVER BATTING AND BOWLING ACTION
IN FULL-BODIED ANIMATED GRAPHICS —
UNDER TOTAL JOYSTICK CONTROL!

[illegible]

The authors have nothing to disclose.

CABLE-GRAM

URGENT

TO ALL DRAGON OWNERS STOP RELEASE DATE

IN UK APRIL 10th FOR OUAZIMODO STOP

3 MACHINE CODE PROGRAM STOP 10 SCREENS

AND 4 DIFFICULTY LEVELS STOP ONLY

E8.75 STOP AVAILABLE THROUGH CABLE

SOFTWARE STOP 52 UMBURY ROAD LUTON

BEDS STOP & DEALER ENQUIRIES LUTON

501493 END MESSAGE


```

660 IF M > OTHERS:GO
670 M=1
680
690 A(2)=A(1)+M
700 IF A(1) <= AND A(2) <= AND A(3) <= OTHERS:GO
710 IF M/2=INT(M/2) THEN M=4*ABS(M-32)
720 IF M < "Y" THEN M=32
730 GOSUB 150
740 PRINT:GOTO 750
750 PRINT:GOTO 760
760 PRINT:GOTO 770
770 GOTO 800
780 IF A(2) < A(1) AND A(3) < A(2) THEN M=20
790 IF A(2) < A(1) AND A(2) < A(3) THEN M=70
800 GOTO 600
810 SOUND 20,5: SOUND 150,5: SCORE=SCORE+1: T=T+1: PRINT: PRINT: PRINT: PRINT: PRINT: "COMMR
ATULATIONS "A(1).": PRINT: "I'D BETTER CHECK MY WINNER!!!": GOTO 830
820 SOUND 150,5: SOUND 20,5: T=T+1: PRINT: PRINT: PRINT: PRINT: PRINT: "HMM HA "A(1): "I'VE B
EATEN YOU!!!"
830 PLAY "T2P1": NEXT I
840 PER=INT(SCORE/T+100)
850 CLS: PRINT: "FINAL SCORE=": PER: " % "
860 IF PER < 50 THEN GOTO 900
870 IF PER < 55 THEN GOTO 950
880 IF PER < 70 THEN GOTO 990
900 FOR I=1000-1: READ S: NEXT I
910 FOR I=1 TO 8: S=S+RND(1): NEXT I
920 PRINT: "PERSONAL RATING: "; R:
930 PRINT: "*****": PRINT: "*****"
940 R="Y100L400L150FV14L400L150FV15L400L20L400V40L20L400V40L3L20L400L20L4
00V40L15L5L40L40L20L32L4000000000": PLAY "T12": R:
950 END
960 IF INKEY="" THEN GOTO 990
970 SOUND 100,1
980 CLS: PRINT "INSTRUCTIONS:"
990 PRINT " THERE ARE 2 ROWS OF STARS"
1000 PRINT " THESE MAKE UP A BOARD."
1010 PRINT " NOW "A(1): " YOU PLAY AGAINST"
1020 PRINT " ME TO REMOVE 1 OR MORE STARS"
1030 PRINT " FROM A CHOSEN ROW."
1040 PRINT
1050 PRINT " THE WINNER IS THE PLAYER"
1060 PRINT " (OR COMPUTER:) WHO TAKES THE"
1070 PRINT " LAST STARS: FROM THE BOARD."
1080 PRINT: PRINT: PRINT: PRINT: "PRESS ANY KEY TO CONTINUE": GOSUB 960
1090 CLS: PRINT: "A WORD OF WARNING:"
1100 PRINT: "ONLY A SKILLFUL PLAYER"
1110 PRINT: "CAN BEAT ME."
1120 PRINT: "YOU HAVE BEEN WARNED!!"
1130 FOR I=1 TO 1000: NEXT I: CLS: RETURN
1140 PRINT: "*****"
1150 PRINT: "*****"
1160 FOR I=1 TO 1
1170 M=M+32
1180 PRINT: " ROW: ";
1190 IF A(1) <= OTHERS: "": GOTO 1230
1200 FOR D=1000-1: S=S+RND(1): NEXT D: PRINT: "
1210 NEXT I
1220 RETURN
1230 DATA GRABBY, LEARNER, IDIOT, MUTEWER, USELESS
1240 DATA FAIR, NOT BAD, SCHOOL BOY, OKAY, AVERAGE
1250 DATA BETTER THAN MOST, DOING WELL, GOOD PLAYER, PRETTY GOOD, ABOVE AVERAGE
1260 DATA FANTASTIC, SUPER, BRILLIANT, WELL ABOVE AVERAGE, VERY GOOD

```

Memory

From James Leigh in London

THE FOLLOWING program is written in standard Microsoft Basic and should run, or be easily converted to run, on any machines which support hexadecimal

values. The program is based on the MKIBUG/BWBUG type of memory scanning/modifying routines which are included in most machine code monitors, the main difference being that this version is

DRAGON/TANDY £31.50
SPT/TELE 35.00 including

TOP VALUE LIGHT PEN

DRAGON 32/TANDY COLOUR 32K/SPECTRUM 48K

THE NEW ADVANCED PROGRAM

for the Trojan light pens include the following facilities:

- * DRAW BOX
- * DRAW CIRCLE
- * DRAW LINE
- * DRAW PICTURES FREEHAND
- * COLOUR FILL DESIGNATED AREAS
- * SAVE AND LOAD PICTURES TO AND FROM TAPE
- * FILL, ERASE FACILITIES

All in Hi-Res screen in any of 4 colours for the Dragon/Tandy, and 8 colours for the Spectrum.



- * DATA ENTRY AND PROCESSING
- * MENU SELECTION AND CONTROL
- * GAMES PLAYING

This is a first-class program which gives hints and tips on how to write programs for the pen. Ideal for many educational uses.

A top quality pen plus a first-class program. The best value pen package available.

Send cheque/P.O. to
TROJAN PRODUCTS
166 Herbyway, Burslem, Stafford SA2 8PP
Tel: (0792) 265491

TROJAN

Micro Computer Software & Accessories

READ AVAILABLE FROM GOOD COMPUTER DEALERS



The best books for the Dragon 32



The Working Dragon 32

A library of practical sub-routines and programs. *£10.95 (pb)*
 "There clearly is a need for books of this kind which provide more than just games." — *Practical Computing*, Sept 1983
 "It is a good one!" — *Personal Computer News*, May 26 1983



The Dragon Trainer

Written as a combined manual and beginners course on the power of Dragon Basic. It is aimed at the beginner and assumes no previous experience of computing. *£10.95 (pb)*

Dragon 32 Games Master

Learn how to write your own top level games. *£10.95 (pb)*
 "If you can't write a half-way decent game after this then it will be down to your own lack of imagination. I would recommend the Brain book as the best of this selection." — *Which*, March — Sept 83

Advanced Sounds & Graphics for the Dragon Computer

All the major aspects of the sound and graphics capabilities of this machine are covered in extensive detail. *£10.95 (pb)*



Plus Sunshine Software



Cracking

Quick thinking and dexterity are required to master this high speed chase game.

Look out for their Sunshine range in W.D. Smith's, Boots, John Menzies, other leading retail chains and through our national network of bookshops and specialist stores.

Dealer enquiries: 01-734 5454.

- | | |
|---|--|
| <input type="checkbox"/> Please send me | <input type="checkbox"/> Dragon 32 Games Master at £3.95 each |
| <input type="checkbox"/> The Working Dragon 32 at £3.95 each | <input type="checkbox"/> Advanced Sound & Graphics at £3.95 each |
| <input type="checkbox"/> The Dragon Trainer at £3.95 each | <input type="checkbox"/> Cracking at £4.95 each |
| <input type="checkbox"/> The Dragon 32 Games Master at £3.95 each | |

Send cheque/postal order for £... made payable to Sunshine Books, 15-17 Little Newport St., London WC2R 2JD

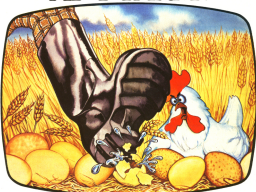
Name _____

Address _____

Signature _____

We can normally deliver in 4-7 days.

THERE'S TROUBLE AT T'FARM!



One of the best selling games in BBC 32K, Electron, Spectrum! Now available on Dragon 32K and 64K.

£7.90

DEADLY Chuckie egg!™

A FARMYARD ARCADE STYLE GAME!

You have to collect 10 eggs and come to finish the screen — but there are quite a many chickens chasing you so you try to escape up the screen. You can jump onto the moving like and make sure you get off before you reach your limit against the roof.

The chickens are on a fixed path but if you're good enough to reach the 10th screen, the chicken escapes from his golden cage and can move anywhere on the screen.



DIRECT FROM MAIL ORDER DEPT. TEL: 0706 347115. POSTAGE AND PACKING FREE.

☐ SEND MONEY BY

TOTAL CHARGE BY P.O. ENCLOSED OR CREDIT CARD NUMBER _____

NAME _____

ADDRESS _____



A&F software

Unit 11, Canal Side Industrial Estate,
Woodbine Street East, Rochdale, Lancashire OL16 4LR.

written in BASIC. The program will enable you to examine the contents of any memory location and to change the contents of the location (assuming that it is RAM).

When RUN you are asked to enter the HEX address of the memory location to be examined or altered, the computer then prints out the address in decimal and in hex. If the contents of the address are a valid ASCII character then the character will be printed, followed by the contents of the location printed in hex.

To change the memory contents type in the new value in hex, the next location will then be displayed in the same way ready for examination or modification. If no change is to be made then it is possible to step forward one address at a time by pressing the right arrow key. If you wish to step back then pressing the left arrow key will give access to the previous memory

location in exactly the same way. Pressing the up or down arrow keys will enable you to step backward or forwards in memory by ± 10 or ± 15 locations respectively.

If a mistake is made when modifying memory, it can be easily corrected by using shift and left arrow if it is a mistake in the first hex character, (bring nibble) and re-entering the correct value. If the mistake is in the second hex character then simply use left arrow to step back and re-enter the correct value. In order to select a different address to be examined simply press the ENTER key and the program deals for the hex address of the location at which examination is to begin.

Variables

AD	Backspace character.
WS	8H for hex values.
ADR	Address of first location.

AD	Current address.
DA	Current data.
DA	Current data nibble.
DA	Has input nibbles.
DA	Has a byte.

Program notes

Lines	Get start address.
20	Print decimal address and hex address with leading zeros.
30-40	Format and print ASCII character and hex data.
	Get command.
50-70	Backspace and print new data.
80-140	Store new data, check for RAM, notify error.
150-180	Error correction backspace, notify that no hex error has occurred.
190-280	
290	

```
10 CLS: A$=CHR$(0)
20 PRINT: INPUT "ENTER HEX ADDRESS"; ADR; WS="5H"; ADR=ADR+ADR; ADR=VAL (ADR)
30 PRINTADR;" "; IFADR<4096 THENPRINT"0"; IFADR<256 THENPRINT"0"; IFADR<
16 THENPRINT"0";
40 PRINTHEX(ADR);" ";
50 DA=PEEK (ADR);PRINT"-"; IF (DA<32 THENPRINT"-"; ELSEPRINTCHR$(DA);
60 PRINT"- ";
70 IFDA<16 THENPRINT"0";HEX$(DA);" "; ELSEPRINTHEX$(DA);" ";
80 I=1
90 XB(1)=INKEY$: IF XB(1)="" THENPO
100 IFXB(1)=CHR$(9) THENADR=ADR+1;PRINT:GOTO30
110 IFXB(1)=CHR$(8) THENADR=ADR-1;PRINT:GOTO30
120 IFXB(1)=CHR$(94) THENADR=ADR+16;PRINT:GOTO30
130 IFXB(1)=CHR$(100) THENADR=ADR+16;PRINT:GOTO30
140 IFXB(1)=CHR$(13) THENZ0
150 IF I=1 THEN PRINT STRING$(3,WS);
160 PRINTXB(1); IFXB(1)="" THENI0
170 IF VAL (ADR+XB(1))>0 THEN GOTO210
180 IF I=2 THEN PRINT:GOTO190 ELSE I=2:GOTO90
190 XB=XB+XB(1)+XB(2)
200 FORADR,VAL (XB): IF PEEK (ADR)<VAL (XB) THEN PRINT" not" "mem":GOTO30
ELSE ADR =ADR+1:GOTO 30
210 IF XB(1)=CHR$(12) THEN PRINT:GOTO30 ELSE PRINT" NOT HEX":GOTO30
```

Numbers

From A Concept in State-of-Trent

I HAD DIFFICULTY writing lengthy programs and not having a printer. The difficulty was simply not knowing the line numbers of each section of the program. However, I soon adopted a standard scheme. This consisted of putting all the declarations and control statements on lines 10 to 99, all the subroutines on lines 100 to 1099, and then starting each main section of the program at 11 thousand (at 1080, 2080 and so on).

This was fine until modifications or additions called for renumbering and then once again the line numbers were lost. A simple technique and a short piece of code solved the problem.

The technique is simply to put a REM statement in front of each sub-routine and each main section naming it and if necessary making a note of its purpose. The few lines of code shown were placed right at the end of the program, hence the very high line numbers. In operation it is only necessary to call for a LIST of the program and note the last line number. A GOTO this line number will then list all the REM statements and their positions (line numbers).

Note that it is essential to use REM statements and not the abbreviation. The abbreviated form is used in line 60000 to mark the end of the program. The only other requirement is that in line 60000 LOC must be set equal to the store address + 1 at which the program starts. 7681 is correct when four graphics pages are in use but must be altered if this is changed. (For example 13025 if all eight pages are in use.) Remember also that if a program has just been loaded from tape and not yet RUN, it will be sitting at 7681 whatever the PCLEAR instruction says. Alternatively omit the LOC statement from line 60000 and give the correct value in the immediate mode before the GOTO.

```
60000 :END
60010 :IFPEEK (LOC+4)=130 THENPRINT (PEEK (LOC+2)+256+PEEK (LOC+3)); FORI=LOC
+5 TOPEEK (PEEK (LOC+4)+58 THEN :END LOC=256+PEEK (LOC-1)+1:PRINTCH$(PEEK (I));
: NEXTI:PRINT:ELSE IF
60020 LOC=PEEK (LOC)+256+PEEK (LOC+1):GOTO60010
60030 LOC=7681:GOTO60010
```


Test your reactions

THIS IS a simple game to test your reactions. Use it made of the Dragon's Timer function to measure the speed of your reactions.

```

250 CLS:PRINT "*****STEP 11: END*****"
260 FOR i=1 TO 1000:PRINT i:WEND
270 CLS:PRINT "*****THIS IS A GAME TO TEST*****"
280 PRINT "YOUR REACTION TIME"
290 PRINT "PRESS THE SPACEBAR TO START"
300 PRINT "AFTER A SHORT DELAY YOU WILL"
310 PRINT "HEAR A BEEP" AND THE FOLLOW
320 PRINT "YOU WILL FALL DOWN THE SCREEN"
330 PRINT "THE OBJECT OF THE GAME IS TO"
340 PRINT "STOP IT AS QUICKLY AS POSSIBLE"
350 PRINT "BE PRESSING THE SPACEBAR AGAIN"
360 PRINT "PRESS SPACEBAR TO CONTINUE"
370 PRINT:IF i=0 THEN i=100
380 CLS:PRINT:IF i=0 THEN i=100
390 FOR i=1 TO 400:STEP 10
400 PRINT:WEND
410 PRINT:PRINT "PRESS SPACEBAR TO START"
420 PRINT:IF i=0 THEN i=100
430 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
440 PRINT:IF i=0 THEN i=100
450 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
460 PRINT:IF i=0 THEN i=100
470 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
480 PRINT:IF i=0 THEN i=100
490 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
500 PRINT:IF i=0 THEN i=100
510 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
520 PRINT:IF i=0 THEN i=100
530 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
540 PRINT:IF i=0 THEN i=100
550 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
560 PRINT:IF i=0 THEN i=100
570 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
580 PRINT:IF i=0 THEN i=100
590 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
600 PRINT:IF i=0 THEN i=100
610 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
620 PRINT:IF i=0 THEN i=100
630 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
640 PRINT:IF i=0 THEN i=100
650 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
660 PRINT:IF i=0 THEN i=100
670 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
680 PRINT:IF i=0 THEN i=100
690 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
700 PRINT:IF i=0 THEN i=100
710 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
720 PRINT:IF i=0 THEN i=100
730 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
740 PRINT:IF i=0 THEN i=100
750 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
760 PRINT:IF i=0 THEN i=100
770 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
780 PRINT:IF i=0 THEN i=100
790 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
800 PRINT:IF i=0 THEN i=100
810 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
820 PRINT:IF i=0 THEN i=100
830 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
840 PRINT:IF i=0 THEN i=100
850 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
860 PRINT:IF i=0 THEN i=100
870 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
880 PRINT:IF i=0 THEN i=100
890 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
900 PRINT:IF i=0 THEN i=100
910 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
920 PRINT:IF i=0 THEN i=100
930 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
940 PRINT:IF i=0 THEN i=100
950 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
960 PRINT:IF i=0 THEN i=100
970 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
980 PRINT:IF i=0 THEN i=100
990 PRINT:PRINT "PRESS SPACEBAR TO CONTINUE"
1000 PRINT:IF i=0 THEN i=100

```

Transmedia

From 4 Fyle in Edinburgh
DRAGON OWNERS who have recently bought disk drives may find it useful to automatically transfer several programs from tape to disk in one go. The following short program and the accompanying executive (macro) file are written to do this for the Delta/Gemina system. The routine will only work with Basic programs like, say,

there is no danger of overwriting the DOS memory in RAM during transfer. Machine code files and data files will result in error messages.

As variables are cleared during `CLDAD` they must be stored in addresses at the top of RAM. I have used the address `31201` for the total number of files which are to be transferred and `31200` for the running count of files read.

Take care when building Thematic. Type it in exactly as written as there is no way to edit an associative line (you will have to hit a hard build again). If you save the

Basic program on disk as "TRANSFER", it can be used by typing `FROM TRANSFER` and will work automatically on up to 10 files. When it's all over, it's best to follow the advice given in the *Delta* manual—load each program, remove the disk from the drive and type `FLUSH`. As the manual says, loading machine code from within a program may present problems. Alternatives you can try out of Basic variable access indirectly by an OMI error, in which case you will not be able to use the program from disk, unless you prove it

```

10 CLEARQ00,31220:CLS:PRINT#7,"TAPE-TO-DISK PROGRAMS TRANSFER"
20 PRINT#PRINT,"INPUT HOW MANY FILES TO TRANSFER":M
30 FORK=1TO1:N:MOTOROFF
40 IF K=0 THEN PRINT#PRINT"SORRY... MAXIMUM OF TEN FILES":GOTO
Q000,1:FORK=1TOQ000:NEXT:GOTO140
50 PRINT#PRINT:"INSERT TAPE AND SWITCH TO play"
60 PRINT#Q000,"PRESS <SPACEBAR> TO":PRINT#423,"COMMENCE TRANSFER"
70 IN=INKEY$:IF IN="" THENTO
80 FORK=1TO5:1:DO:TRANSFER

```

Figure 1: The basic two-to-one transfer concept.

```
BUILD "TRANSMAC"
TYPE 255 CHARS
CLOSE
I=PEEK(31230):FORA=1024TO1033:IF
PEEK(A)<>76THENF#=F#+CHR$(PEEK(A)):NEXT
CLS:PRINT:PRINT"SAVING ";F$:SAVE
F$:PRINT
IFPEEK(31231)>1 THEN POKE31230,I
+1:DO"TRANSMAC"
CLS:PRINT:PRINTI;"PROGRAMS HAVE
BEEN SAVED":PRINT:PRINT
< BREAK >
```

Downloaded At: 11:53 11 September 2009

Copyright © 2006 John Wiley & Sons, Ltd.

Classified

Sound

From Bobby Patel in *Lines*

THIS PROGRAM is a sound graph to demonstrate how sound can be detected via the cassette port on the computer. When RUN, you will see a line going across the screen. You then play some music as if you were making a normal program. You will then see the line going up or down according to the sound.

There are two Plots in the program. They are PEEK (88312) and PEEK (88314), detecting quiet and loud noise.

```

10 REM SOUND GRAPH BY BOBBY PATEL AGED 12
20 AUDIO ON
30 PMODE, 4:PCLS:SCREEN1,1
40 LINE(0,100):PSET
50 FOR X=0 TO 255 STEP 5
60 IF PEEK(88312)=1 THEN Y=180 ELSE Y=100
70 IF PEEK(88314)<255 THEN Y=20
80 LINE-(X,Y):PSET
90 NEXT X
100 PCLS
110 GOTO40

```

Database

From John Peart in *Northampton*

THIS PROGRAM is basically a small scale database which uses the power of the Dragon's file handling system to store the information contained on cassette tape.

The program allows the storage and retrieval of up to 700, 50-character strings. The name Laser is gained from the way initial letters on the menu page are built.

Once information is recorded, you can load an old database into tape, add to the memory file up to a maximum of 700 entries, search for all items present in

strings, which, if found, will be displayed on the screen, and after a specific entry, if your entry is too high, it is not allowed. This is most useful for spelling corrections.

Memory in this program is tight, which explains the lack of RAMs and modification opportunity. Anyone wanting to make modifications should alter the amount of entries allowed in the storage room thus making more space available.

The entries are displayed on screen, one by one, from the start. You can use A to move up the entries, Z to move down them and E to end the print routine.

Program notes

Lines 10-30 Sets up arrays and string

space. Displays and INFO's the menu page. Routine to add to the file. Routine to save the file in memory. Routine to load the old file from the tape. Routine to print out parts of the file. Routine to search for items in the file. Routine to alter entries.

There are no BASIC statements in the program as my cassette has no Basic plug, so if they are necessary they should be added to existing lines to save memory space.

```

10 PCLS:REM
20 CLS:PRINT:PRINT
30 SCREEN 1:CLS
40 DIM A(255),P(255),S(1000),C(1000),D(1000),E(1000),F(1000),G(1000),H(1000),I(1000),J(1000),K(1000),L(1000),M(1000),N(1000),O(1000),P(1000),Q(1000),R(1000),S(1000),T(1000),U(1000),V(1000),W(1000),X(1000),Y(1000),Z(1000),AA(1000),AB(1000),AC(1000),AD(1000),AE(1000),AF(1000),AG(1000),AH(1000),AI(1000),AJ(1000),AK(1000),AL(1000),AM(1000),AN(1000),AO(1000),AP(1000),AQ(1000),AR(1000),AS(1000),AT(1000),AU(1000),AV(1000),AW(1000),AX(1000),AY(1000),AZ(1000),BA(1000),BB(1000),BC(1000),BD(1000),BE(1000),BF(1000),BG(1000),BH(1000),BI(1000),BJ(1000),BK(1000),BL(1000),BM(1000),BN(1000),BO(1000),BP(1000),BQ(1000),BR(1000),BS(1000),BT(1000),BU(1000),BV(1000),BW(1000),BX(1000),BY(1000),BZ(1000),CA(1000),CB(1000),CC(1000),CD(1000),CE(1000),CF(1000),CG(1000),CH(1000),CI(1000),CJ(1000),CK(1000),CL(1000),CM(1000),CN(1000),CO(1000),CP(1000),CQ(1000),CR(1000),CS(1000),CT(1000),CU(1000),CV(1000),CW(1000),CX(1000),CY(1000),CZ(1000),DA(1000),DB(1000),DC(1000),DD(1000),DE(1000),DF(1000),DG(1000),DH(1000),DI(1000),DJ(1000),DK(1000),DL(1000),DM(1000),DN(1000),DO(1000),DP(1000),DQ(1000),DR(1000),DS(1000),DT(1000),DU(1000),DV(1000),DW(1000),DX(1000),DY(1000),DZ(1000),EA(1000),EB(1000),EC(1000),ED(1000),EE(1000),EF(1000),EG(1000),EH(1000),EI(1000),EJ(1000),EK(1000),EL(1000),EM(1000),EN(1000),EO(1000),EP(1000),EQ(1000),ER(1000),ES(1000),ET(1000),EU(1000),EV(1000),EW(1000),EX(1000),EY(1000),EZ(1000),FA(1000),FB(1000),FC(1000),FD(1000),FE(1000),FF(1000),FG(1000),FH(1000),FI(1000),FJ(1000),FK(1000),FL(1000),FM(1000),FN(1000),FO(1000),FP(1000),FQ(1000),FR(1000),FS(1000),FT(1000),FU(1000),FV(1000),FW(1000),FX(1000),FY(1000),FZ(1000),GA(1000),GB(1000),GC(1000),GD(1000),GE(1000),GF(1000),GG(1000),GH(1000),GI(1000),GJ(1000),GK(1000),GL(1000),GM(1000),GN(1000),GO(1000),GP(1000),GQ(1000),GR(1000),GS(1000),GT(1000),GU(1000),GV(1000),GW(1000),GX(1000),GY(1000),GZ(1000),HA(1000),HB(1000),HC(1000),HD(1000),HE(1000),HF(1000),HG(1000),HH(1000),HI(1000),HJ(1000),HK(1000),HL(1000),HM(1000),HN(1000),HO(1000),HP(1000),HQ(1000),HR(1000),HS(1000),HT(1000),HU(1000),HV(1000),HW(1000),HX(1000),HY(1000),HZ(1000),IA(1000),IB(1000),IC(1000),ID(1000),IE(1000),IF(1000),IG(1000),IH(1000),II(1000),IJ(1000),IK(1000),IL(1000),IM(1000),IN(1000),IO(1000),IP(1000),IQ(1000),IR(1000),IS(1000),IT(1000),IU(1000),IV(1000),IW(1000),IX(1000),IY(1000),IZ(1000),JA(1000),JB(1000),JC(1000),JD(1000),JE(1000),JF(1000),JG(1000),JH(1000),JI(1000),JJ(1000),JK(1000),JL(1000),JM(1000),JN(1000),JO(1000),JP(1000),JQ(1000),JR(1000),JS(1000),JT(1000),JU(1000),JV(1000),JW(1000),JX(1000),JY(1000),JZ(1000),KA(1000),KB(1000),KC(1000),KD(1000),KE(1000),KF(1000),KG(1000),KH(1000),KI(1000),KJ(1000),KK(1000),KL(1000),KM(1000),KN(1000),KO(1000),KP(1000),KQ(1000),KR(1000),KS(1000),KT(1000),KU(1000),KV(1000),KW(1000),KX(1000),KY(1000),KZ(1000),LA(1000),LB(1000),LC(1000),LD(1000),LE(1000),LF(1000),LG(1000),LH(1000),LI(1000),LJ(1000),LK(1000),LL(1000),LM(1000),LN(1000),LO(1000),LP(1000),LQ(1000),LR(1000),LS(1000),LT(1000),LU(1000),LV(1000),LW(1000),LX(1000),LY(1000),LZ(1000),MA(1000),MB(1000),MC(1000),MD(1000),ME(1000),MF(1000),MG(1000),MH(1000),MI(1000),MJ(1000),MK(1000),ML(1000),MM(1000),MN(1000),MO(1000),MP(1000),MQ(1000),MR(1000),MS(1000),MT(1000),MU(1000),MV(1000),MW(1000),MX(1000),MY(1000),MZ(1000),NA(1000),NB(1000),NC(1000),ND(1000),NE(1000),NF(1000),NG(1000),NH(1000),NI(1000),NJ(1000),NK(1000),NL(1000),NM(1000),NO(1000),NP(1000),NQ(1000),NR(1000),NS(1000),NT(1000),NU(1000),NV(1000),NW(1000),NX(1000),NY(1000),NZ(1000),OA(1000),OB(1000),OC(1000),OD(1000),OE(1000),OF(1000),OG(1000),OH(1000),OI(1000),OJ(1000),OK(1000),OL(1000),OM(1000),ON(1000),OO(1000),OP(1000),OQ(1000),OR(1000),OS(1000),OT(1000),OU(1000),OV(1000),OW(1000),OX(1000),OY(1000),OZ(1000),PA(1000),PB(1000),PC(1000),PD(1000),PE(1000),PF(1000),PG(1000),PH(1000),PI(1000),PJ(1000),PK(1000),PL(1000),PM(1000),PN(1000),PO(1000),PP(1000),PQ(1000),PR(1000),PS(1000),PT(1000),PU(1000),PV(1000),PW(1000),PX(1000),PY(1000),PZ(1000),QA(1000),QB(1000),QC(1000),QD(1000),QE(1000),QF(1000),QG(1000),QH(1000),QI(1000),QJ(1000),QK(1000),QL(1000),QM(1000),QN(1000),QO(1000),QP(1000),QQ(1000),QR(1000),QS(1000),QT(1000),QU(1000),QV(1000),QW(1000),QX(1000),QY(1000),QZ(1000),RA(1000),RB(1000),RC(1000),RD(1000),RE(1000),RF(1000),RG(1000),RH(1000),RI(1000),RJ(1000),RK(1000),RL(1000),RM(1000),RN(1000),RO(1000),RP(1000),RQ(1000),RR(1000),RS(1000),RT(1000),RU(1000),RV(1000),RW(1000),RX(1000),RY(1000),RZ(1000),SA(1000),SB(1000),SC(1000),SD(1000),SE(1000),SF(1000),SG(1000),SH(1000),SI(1000),SJ(1000),SK(1000),SL(1000),SM(1000),SN(1000),SO(1000),SP(1000),SQ(1000),SR(1000),SS(1000),ST(1000),SU(1000),SV(1000),SW(1000),SX(1000),SY(1000),SZ(1000),TA(1000),TB(1000),TC(1000),TD(1000),TE(1000),TF(1000),TG(1000),TH(1000),TI(1000),TJ(1000),TK(1000),TL(1000),TM(1000),TN(1000),TO(1000),TP(1000),TQ(1000),TR(1000),TS(1000),TT(1000),TU(1000),TV(1000),TW(1000),TX(1000),TY(1000),TZ(1000),UA(1000),UB(1000),UC(1000),UD(1000),UE(1000),UF(1000),UG(1000),UH(1000),UI(1000),UJ(1000),UK(1000),UL(1000),UM(1000),UN(1000),UO(1000),UP(1000),UQ(1000),UR(1000),US(1000),UT(1000),UU(1000),UV(1000),UW(1000),UX(1000),UY(1000),UZ(1000),VA(1000),VB(1000),VC(1000),VD(1000),VE(1000),VF(1000),VG(1000),VH(1000),VI(1000),VJ(1000),VK(1000),VL(1000),VM(1000),VN(1000),VO(1000),VP(1000),VQ(1000),VR(1000),VS(1000),VT(1000),VU(1000),VV(1000),VW(1000),VX(1000),VY(1000),VZ(1000),WA(1000),WB(1000),WC(1000),WD(1000),WE(1000),WF(1000),WG(1000),WH(1000),WI(1000),WJ(1000),WK(1000),WL(1000),WM(1000),WN(1000),WO(1000),WP(1000),WQ(1000),WR(1000),WS(1000),WT(1000),WU(1000),WV(1000),WW(1000),WX(1000),WY(1000),WZ(1000),XA(1000),XB(1000),XC(1000),XD(1000),XE(1000),XF(1000),XG(1000),XH(1000),XI(1000),XJ(1000),XK(1000),XL(1000),XM(1000),XN(1000),XO(1000),XP(1000),XQ(1000),XR(1000),XS(1000),XT(1000),XU(1000),XV(1000),XW(1000),XX(1000),XY(1000),XZ(1000),YA(1000),YB(1000),YC(1000),YD(1000),YE(1000),YF(1000),YG(1000),YH(1000),YI(1000),YJ(1000),YK(1000),YL(1000),YM(1000),YN(1000),YO(1000),YP(1000),YQ(1000),YR(1000),YS(1000),YT(1000),YU(1000),YV(1000),YW(1000),YX(1000),YY(1000),YZ(1000),ZA(1000),ZB(1000),ZC(1000),ZD(1000),ZE(1000),ZF(1000),ZG(1000),ZH(1000),ZI(1000),ZJ(1000),ZK(1000),ZL(1000),ZM(1000),ZN(1000),ZO(1000),ZP(1000),ZQ(1000),ZR(1000),ZS(1000),ZT(1000),ZU(1000),ZV(1000),ZW(1000),ZX(1000),ZY(1000),ZZ(1000)

```


OPERATION GREMLIN . . .

A very different game that combines the intrigue of adventure with the real time, machine code speed of arcade action. The player must control one, but EIGHT different troopers, each with their own character states, in the search for the weapons that will destroy THE GREMLINS.

DRAGON TREK

Dragon Trek is a new implementation of a classic game, taking full advantage of the Dragons hi-res graphics and sound capabilities. Your starship's impressive armament is comprised of high energy Photon Torpedoes and Phasers. Both long and short range scanners (in full graphics) enable you to track the Klingons and your onboard computer will give you advice/tactical facilities. As commander you will have to use strategy and cunning to survive the enemy.

THE RING OF DARKNESS

BRITAIN'S No. 1 ADVENTURE GAME FOR THE DRAGON 32 IS NOW AVAILABLE FOR THE 48K SPECTRUM AND ORIC

THE RING OF DARKNESS is a complete role playing adventure in hi-res graphics, featuring a detailed land filled with towns, 3D dragons, forests and seas, and populated by kings, princesses, evil gangers and other strange creatures. All versions are identical with respect to the adventure. The Oric version is recorded in fast mode only. Many hours of mystery and suspense await you in your quest to find The Ring Of Darkness.

ORDER WITH CONFIDENCE:
All titles in stock are dispatched by return of post.
SEND SAE FOR OUR FREE CATALOGUE.

Selected titles are also available from good software outlets and from Books.



Complete this order form and post it to: WINTERSOFT, Dept. CUL, 30 Uplands Park Rd., Enfield, Middlesex, EN2 7PT.

DRAGON 32	
The Ring Of Darkness	£1.50
Dragon Trek	£2.50
Operation Gremlin	£4.50
Amstrad/Commodore	£4.50
ORIC-1 48K	
The Ring Of Darkness	£3.50
Operation Gremlin	£4.50
SPECTRUM 48K	
The Ring Of Darkness	£3.50
Include my cheque (PO box)	
SALE	
NOTES	

All prices include s.p.a. VAT and the WINTERSOFT guarantee of quality and reliability.

WINTERSOFT
SOFTWARE

WINTERSOFT, 30, Uplands Park Road, Enfield, Middlesex EN2 7PT.

DEALER ENQUIRIES WELCOME 01-867 5729

Dragon Answers

Jammed up with RAM

VARIOUS ARTICLES that I have read have suggested that the Dragonides system uses up most of the available RAM in the Dragon 32 and that a Dragon 64 would be necessary in order to use it.

However, the review of disk systems in Dragon User makes no mention of the amount of RAM used. I would be very grateful to have your comments regarding this aspect of the Dragonides and the Delta systems.

C A Ridd
Moss
Stafford

BOTH THE Dragonides and Delta Des are very similar in the amount of memory space used — both are in cartridge form and so occupy the cartridge memory (8K, from 49152). Obviously, some RAM is needed for buffers and system variables and again both systems use only 175K (about 1536 bytes) of RAM. For example on power up of the Dragonides you get 25000 free bytes plus the usual 4 graphics pages, so very little RAM is actually used.

Where the systems differ is that the Dragonides uses RAM from address 1536 and moves all graphics pages up one, and the Delta Des uses reserved memory at the top of RAM and doesn't alter the graphics, etc.

You will need a 64K Dragon to run Dragon Data's new OS2 software, with this, an operating system is needed into memory and then all ROMs are paged out leaving clear RAM for the disk software. However, this is only likely to interest small business users to any extent.

Addressing a problem

I WONDER if you could help me with the following problem.

How could I switch on and off a machine-code utility program like the Keybase program in a previous issue of Dragon User, using maybe something like ROMS (changing ON/OFF/KEYBASE ON) without having to keep on typing F00E, 0400, 040E, F00E, 0400, 040E?

More than likely this would



need further machine code program and this program may interfere with the Keybase program. P A Jones, Junction, Hampshire

IT IS quite simple to add new commands to the Dragon Basic provided you have a fair knowledge of machine code. The addresses you need to know are:

200-200 = Number of new commands.
200-200 = Address of first of new words (the last letter of each word ends with 01 F set, in fact 120).

200-200 = Address of dispatch routine. When a new command is entered its code will be in the A register and the Basic will jump to the address to be dispatched to the new routine.

Similar addresses apply for the addition of new functions although more care is needed to add them. These addresses are 300 to 303.

Note that as this is the method cartridges use to extend the Basic you cannot add two sets of new commands, and so this method cannot be used with, for example, a disk system operating.

Moving upwards

I HAVE a couple of questions relating to the Dragon 32. Firstly, after reading the article in the January issue of Dragon User on upgrading the Dragon to 64K, I am considering having my Dragon upgraded by Microcare.

However, if this were done, would it still be possible to use an Ed + cartridge and Teletext package without difficulty?

Secondly, whilst using Teletext, I occasionally find difficulty in reloading saved data files as the loader signal generated by the Dragon is either too weak or partially received whilst the rest of the data is well received. Therefore, is there a way of improving the strength of the loader signal?

J E Thomas
Andover
Hants

WITH 64K upgrades and the official Dragon 64 it is quite possible to use cartridges, but this only allows you access to 32K of memory unless they are paged out (together with the Basic ROM) to give a 64K sub-machine.

The strength of the cassette loader can be altered by location 144. Before using Teletext, type F00E 144 4 and this should prevent any further problems with saving and loading files.

Adding code

THE CLOAD command has the effect of moving from memory any code previously input or loaded. What I would like to be able to do is append to some code already in memory, more code from tape. Is this possible?

David Sherry
East Hantsford
Dorsetford

THE METHOD required to append programs is shown below and this should work with most Basic programs.

- 1: CLOAD first program
- 2: P00E 100, P004 020

- P00E 101, P004 030
- P00E 20, P004 020
- P00E 20, P004 020 — 2

- 3: CLOAD next program
- 4: Remember this if necessary
- 5: P00E 20, P004 100
- P00E 20, P004 001
- 6: Go back to step 2 if more programs are to be appended.

Locations 20 and 20 hold the start address of the Basic program, locations 27 and 28 the start of the variable space. Locations 100 and 101 are just used as temporary stores here and are normally used for high-res graphics work.

CSAVE command

THE DRAGON 32 manual quotes a command CSAVE "filename" which "saves data in ASCII format", without further explanation. Which data does it save, and how are they identified? Isn't everything saved in ASCII format anyway?

What is the effect of the reset button (not the reset command)? Is it any different from switching off and on again, apart from the fact that the copyright lines don't appear?

Ruben Haskel
London

ON YOUR first point, the CSAVE "..." command does the equivalent of a LIST to the cassette recorder. That is, the Basic program currently in RAM is saved to tape in ASCII data format and this can then be read back in, either using CLOAD or INPUT — 1. The normal CSAVE command saves the Basic program in identified form which saves memory and tape. This is the form that the program exists in in RAM. Try the following to see for yourself:

P001A 4, P001 1 — 1000 10
0000 (P00A) (P00A) (P00A) (P00A)

The reset button is connected to the reset pin on the 6800 CPU and when pressed causes the reset routine to be executed. This routine simply resets the Basic and CPU stacks and restores text mode returning to command mode. It doesn't have the same effect as switching off then on as the Basic vectors are not initialised. If you type P00E 110 0 before pressing reset then you can simulate switching off and on by doing a cold start.

Competition Corner

Answers to Competition Corner,
Dragon User, 12/15 Little Wymond
Street, London WC2R 2LD

TO WHET YOUR appetite for this month's competition I have devised a computer for you to solve.

I have a sheet of newspaper. At 12 noon I tear the paper in two halves. Fifteen minutes later I tear the two pieces into four, and 15 minutes after that I tear the four into eight. I repeat this procedure every quarter of an hour until midnight. If I tear the pieces of paper one at a time of the other, how long will this job be?

To obtain the answer, assume that there is a thickness of 100 sheets to the inch and run this program:

```
10 T = 2
20 FOR N = 1 TO 48
30 T = T * 2
40 NEXT N
50 PRINT "HT. of PILE IS:"
  T/(100 + 63060), "INCHES"
```

This gives the answer of over 68 million miles — almost the distance from the earth to the sun. As you can see, the computer tackles the problem by doubling the value of T, 48 times. This represents the number of pieces of paper produced, and the total is then divided by 100 + 63060 to arrive at the number of miles in the answer. To see how the computer handles such large numbers add the line:

```
55 PRINT N, T
```

and run the program again. This will show the effect on the value T, as it is repeatedly doubled.

Overflow

The maximum number of digits that the Dragon can handle as a variable is nine, so once T has exceeded this another form of notation has to be used to express the larger order of numbers, otherwise an overflow situation would result. Consequently, the computer switches automatically to scientific or exponential notation, and for example, the first value listed in this form will be:

```
1.073741e001 + 99
```

The E + 00 means that to obtain the true value the decimal point should be moved nine places to the right. Similarly, the final value in the list is:

```
5.626499494E + 14
```

which would need to have the decimal point moved 14 places to the right. This represents an actual value of 5.626499494000000 (to an accuracy of nine significant figures.)

The computer then divides this figure by 100 + 63060 — to arrive at the answer in miles. This division brings the final value down to within the range that the computer can display conveniently, so it switches back automatically to ordinary notation and displays the answer as 88649434.5.

Note the plus sign immediately after the 'E' when figures are displayed in exponential notation. Very small numbers have a minus sign, which indicates that the decimal point should be moved to the left. So 4E-12 is the same as 0.000000000004. Remember that the sign refers only to the exponential part, and not to the number

Win an Ultra Drive from Ikon

Find the highest number of primes in Gordon Lee's puzzle



itself, which can be positive or negative in its own right. Also, take care not to confuse this form of exponentiation with the computer's EXP or inverse log function!

Usually, when large or small numbers are referred to in print they are expressed as a decimal multiplied by a certain power of 10, for example, the distance of the star Alpha Centauri may be given as 2.240 × 10¹⁷ miles. This is exactly the same as 2.240E + 17, in the notation that we have just been discussing.

Finally, consider the number 1 E + 36. On page 144 of the Dragon manual you will see the overflow error code OV, which occurs when the computer attempts to handle a value larger than this figure, but how large is 1E+36? It is difficult to imagine such a number. Even writing it in full (1 followed by 36 zeros) will probably be just as confusing. As a comparison, the remotest object so far detected in the universe is at a distance of 14,500 million light years. This is equivalent to approximately 5.4E + 27 inches, a figure well within the capability of the Dragon. Now, on to the competition.

Readers are probably familiar with the 'Wordsearch' puzzles found in magazines, where words are interlocked into a grid. This month's competition involves compiling such a grid, but using digits



Prize

USERS WHO are tired of storing their data on cassette recorders but can't afford to move up to disk drives now have the Ultra Drive to turn to.

This drive provides high speed storage at a read/write speed of 1,000 characters/second, with a capacity of about 200K per cassette. It is completely automatic and is based on Philips' new digital cassette recorder. And Ikon Computer Products is offering one free to the winner of this month's competition.

Rules

TO WIN this month's prize you must copy your completed grid into a sheet of paper and then list clearly all the primes that you have found. At the top of the page state clearly the number of primes that you are claiming. The winner will be the entrant with the highest score. Please do not send in a cassette containing the answer.

Your entry must arrive at Dragon User by the last working day in May. The names of the winners, and the solution to the puzzle, will be published in our August issue. You may only enter the competition once. Entries will not be acknowledged and we cannot enter into correspondence on the result.

February winners

THE WINNERS of February's competition are C Glen of Peter, Waverhampton and P J Warburton of Wingham, Cleveland. They each receive a package of software from JCB Microsystems for correctly stating that Brian made the incorrect statement and that the others began the game with the following numbers: Arnold (10), Clarence (75), Daniel (71). The package from JCB consists of its Sound and Speech Synthesizer Extension Modules, a stories program which speaks up basic, and the arcade game Blast Goes Ballooning.

rather than letters. The grid is as shown with four digits already entered in place.

The object of the competition is to fill the grid with as many prime numbers as possible. The numbers can read in any direction — up, down, left to right, right to left, or diagonally, as in conventional wordsearch puzzles, but, of course, only in a straight line. The turning of corners is not allowed. For example, the four-digit sequence 8719 would contain the primes 87, 71, 19, 719 and 5719 in one direction and the prime 17 in reverse, as well as the single digit primes 1 and 7. How many primes can you find occupying each prime only once, even though it may appear in the grid several times?

NEW FROM
MICRODEAL
FILMASTR

**Dragon 32
Data Management System**

The Data Management System you can trust. **FILMASTR** combines the best features of the big systems to provide a combination of speed, power and ease of operation that can't be bettered.

YOU are in complete control of this friendly program with no programming knowledge required. You design the data screen with up to 20 fields by moving the cursor on screen with the arrow keys and typing in the field names . . . **FILMASTR** takes care of everything for you.

Enter data by just filling in the blanks this form fill-in is easy and natural to use. You can even copy data from previous records with one key stroke. **ADD RECORDS, DELETE RECORDS, CHANGE RECORDS, ALL WITHOUT FLUSS.**

Tell **FILMASTR** to sort your file on any field that you want or to retrieve a particular file and the job is done with super-human machine language speed. **FILMASTR** will find a single file or a group of files that meet your request and will save those records as a separate file if you want to.

Available from Dragon 32
Dealers Nationwide or
direct from

MICRODEAL Limited,
41, Truro Road, St. Austell,
Cornwall. PL25 5JE.

24 hour orderline: 0726 3456

£19.95 includes p&p



Send First Class stamp for our new
Dragon 32 catalogue.

CONTROLLED PRINTING FORMATS? OF COURSE . . . tell **FILMASTR** which records to use which fields to print and in what order. You can control the print location to any position on the page.

MAILING LABELS? NO PROBLEM.

All commands are given to **FILMASTR** with single keystrokes. Press the **HELP** key (**BREAK**) and the available commands are displayed. Make your choice from the menu and let **FILMASTR** do the work.

FILMASTR can store up to 64 characters in each field and 24,000 characters in each file.



Selected
Microdeal Products
available from larger
branches of



ORIC (16&48K) TANDY COLOUR (16K)
DRAGON 32

SKRAMBLE



Actual picture of screen on

ORIC 48K

Your mission is to penetrate the enemy skramble system and destroy their headquarters. You will start with three of our latest spacefighters equipped with repeating cannon and twin bomb launcher.

If you succeed in evading the elaborate ground defences, you will arrive at the Cave where flying becomes more difficult. In the cave are UFOs, after which you must avoid a hall of meteorites. Very few pilots succeed this far, but if you do, then you must enter the Fortress, followed by the Maze. If you manage to destroy Enemy Headquarters, then your reward will be a more difficult mission! One or two player game.

Machine Language, High Speed, Arcade Action. Full colour graphics with sound. Keyboard or Joystick control.

Available on tape for

ORIC £5.50 DRAGON 32 £8
TANDY COLOUR £8

(Tandy colour version only available at Tandy Shops)

Orders by post to
41 Truro Road, St. Austell,
Cornwall PL25 5AB
Credit Card Hotline 0208 3454



Selected Microdeal titles are
available from larger



Stores and
Computer
Shops
Nationwide

MICRODEAL 1984